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CONTENT OF VOLUME XLIII

1. **Studies on the Agaricaceae of Hokkaido. I**
Sanshi Imai 1

2. **Studies on the Agaricaceae of Hokkaido. II**
Sanshi Imai 179

STUDIES ON THE AGARICACEAE OF HOKKAIDO. I

By

Sanshi IMAI

Introduction

The most important scientific report of the Japanese Agaricaceae was published early in 1860 by M. J. BERKELEY and M. A. CURTIS under the title of 'Characters of New Fungi, collected in North Pacific Exploring Expedition by Charles Wright", in the Proceedings of the American Academy of Arts and Sciences, Vol. IV, pp. 110–130. In this paper 64 species of the Agaricaceae of Japan were first described. Thereafter some fragmental studies of our agarics have been reported by J. SCHROETER, N. TANAKA, P. HENNINGS, P. HARIOT, N. PATOUILLARD, S. KAWAMURA and others.

As for the Agaricaceae of Hokkaido no conclusive report has been published up to the present time. BERKELEY and CURTIS, however, described two new species, *Agaricus* (*Collybia*) *adianticeps* and *Agaricus* (*Galera*) *japonicus*, collected in Hakodate, in their paper mentioned above and the present writer dealt with several agarics collected from various localities in Hokkaido in his papers ever published.

The present studies were first undertaken in 1924 to dwell consistently upon the Agaricaceae of Hokkaido, under the direction of Prof. KINGO MIYABE, and then after his retirement, continued under the direction of Prof. SEIYA ITO.

The materials examined in this study were chiefly collected by the writer himself, supplemented partly by colleagues in our Institute and by other gentlemen in our district.

The specimens examined are preserved in the Herbarium of the Botanical Institute, Faculty of Agriculture, Hokkaido Imperial University.

[Jour. Facul. Agr. Hokkaido Imp. Univ. Sapporo, Vol. XLIII, Pt. 1, March, 1938]

The writer wishes to express his sincere thanks to Prof. Emer. K. MIYABE and Prof. S. ITO for their kind direction and constant encouragement, and to Prof. YOSHIHIKO TOCHINAI for his constant encouragement and kind help in various ways. The expenses of the undertaking between 1934 and 1936 for the botanical excursions of the writer have been mainly defrayed by the Tôshôgû 300nensai Kinenkai to which the writer is very much indebted. The writer also indebted to the gentlemen who have rendered assistance, directly or indirectly, in various ways to the present study.

Agaricaceae FR. emend. P. HENNINGS

in ENGLER & PR. Nat. Pflanzenfam. I, 1,** 189, 197.
Agaricini FR. Syst. Orb. Veg. 65, 1825.
Polyphillei QUÉL. Ench. Fung. 2, 1886.
Agaricineae Auct. plur.

Fructification fleshy or coriaceous, fragile, firm or tough, putrescent or not, reviving with moisture or not, either with floccose trama or vesiculose trama, consisting of a pileus with, or without, a central or lateral stipe, and sometimes with, or without, universal and partial veils. Lamellae usually inseparable from the pileus, except in some genera; hymenium spreads over the surface of the lamellae or narrow and obtuse folds radiating from a stipe or central or lateral point.

Key to the subfamilies and tribes

I. Hymenium spreads over the surface of acute lamellae.
- A. Trama floccose, not vesiculose, fleshy, waxy or coriaceous; spores white in mass .... Subfam. Amanitoideae.
  - 1. Fructification fleshy or subfleshy, putrescent, usually not reviving with moisture.
    - a. Pileus distinct from the fleshy stipe; lamellae soft, usually free from the stipe; fructification with volva and annulus, or with either volva or annulus .... Tribe Amaniteae.
    - b. Pileus confluent and homogeneous with the fleshy stipe; lamellae attached to the stipe, soft; fructification lacking volva when matured.
      - i. Fructification with partial veil remaining as an annulus or arachnoidal veil .... Tribe Armillarieae.
      - ii. Fructification without an annulus or arachnoidal veil.

α. Stipe normally central; lamellae fleshy, soft .... Tribe Tricholomateae.

β. Stipe excentric, lateral or none; lamellae fleshy .... Tribe Pleuroteae.

γ. Stipe normally central; lamellae waxy .... Tribe Hygrophoreae.

c. Pileus confluent with, but heterogenous from the cartilaginous stipe; lamellae attached or free; fructification putrescent, or rarely reviving with moisture, lacking volva and annulus .... Tribe Collybieae.

2. Fructification fleshy-coriaceous or coriaceous, tough, reviving with moisture, not putrescent .... Tribe Lentineae.

B. Trama floccose, not vesiculose, fleshy or subfleshy; spores rosy pink in mass .... II. Subfam. Volvarioideae.

1. Pileus distinct from the fleshy central stipe; lamellae soft, usually free from the stipe; fructification with, or without, volva or annulus .... Tribe Volvarieae.

2. Pileus confluent and homogeneous with the fleshy central stipe; lamellae attached to the stipe, soft; fructification without the veils .... Tribe Entolomateae.

3. Pileus with, or without, an excentric or lateral fleshy stipe; lamellae soft; fructification without the veils .... Tribe Claudopeae.

4. Pileus confluent with, but heterogenous from the cartilaginous stipe; lamellae attached or free; fructification without veils .... Tribe Leptonieae.

C. Trama floccose, not vesiculose, fleshy or subfleshy; spores brown in mass .... III. Subfam. Pholiotoideae.

1. Pileus confluent and homogeneous with a fleshy stipe; lamellae normally attached to the stipe..........

a. Fructification with either a partial veil or an arachnoidal or marginal veil.

i. Fructification with a partial veil remaining as an annulus .... Tribe Pholioteae.

ii. *Fructification usually with an arachnoidal or marginal* veil .... Tribe Cortinarieae.

b. Fructification without veil.

i. Lamellae normal.

α. Stipe excentric or subcentral; lamellae sinuate or adnexed .... Tribe Rhodoteae.

β. Stipe excentric, lateral or none; lamellae more or less decurrent or radiating from a central or lateral point .... Tribe Crepidoteae.

ii. Lamellae decurrent, separable or hardly separable, often venoso-connecting at the base or anastomosing behind .... Tribe Paxilleae.

2. Pileus confluent with, but heterogenous from the cartilaginous stipe; lamellae attached or free; fructification without veils .... Tribe Naucorieae.

D. Trama floccose, not vesiculose, fleshy or subfleshy; spores purple, fuscous or black in mass .... IV. Subfam. Agaricoideae.

1. Pileus fleshy, distinct from the fleshy stipe; lamellae soft, usually free from the stipe; fructification with volva or annulus; spores purple or fuscous in mass .... Tribe Agariceae.
2. Pileus fleshy, confluent and homogeneous with a fleshy stipe; lamellae attached to the stipe, fleshy or subfleshy; fructification with an annulus or marginal veil .... Tribe Strophariеae.
3. Pileus gelatinous-fleshy, confluent with a fleshy stipe; lamellae attached to the stipe, mucilaginous; spores greenish fuscous or blackish in mass .... Tribe Gomphidieae.
4. Pileus membranous or fleshy-membranous, confluent with, but in the majority heterogenous from the cartilaginous or subfleshy stipe; lamellae free or attached, deliquescent or not; spores fuscous- or blackish-purple, or black in mass .... Tribe Coprineae.

E. Trama vesiculose, lactiferous or not, fleshy, brittle; spores white, yellow or ochraceous in mass .... V. Subfam. *Lactarioideae*.

II. Hymenium spreads over the surface of narrow, obtuse lamellae or folds, or nearly smooth surface .... VI. Subfam. Cantharelloideae.

Subfam. **Amanitoideae** IMAI, nom. nov.

Leucosporae Auct. plur. p. p.

Trama floccosa, carnosa, ceracea vel coriacea, non vesiculosa. Hymenium superficiem lamellae acris tegit. Sporae in cumulo albae. Cetera ut in Familia.

Tribe **Amaniteae** SINGER emend. IMAI.

Volvariées ROZE, Bull. Soc. Bot. Fr. XXIII, 51 & 111, 1876, p. p.
Lepiotées ROZE, Ibid. 51 & 111, 1876, p. p.
Amanitées ROZE, Ibid. 51 & 114, 1876.
Amanitées R. MAIRE, Rech. Cytol. Tax. Basid. 136 & 146, 1902, p. p.
Amanitées KONR. et MAUBL. Icon. Sel. Fung. 28 & 30, 1925.
Lepiotées KONR. et MAUBL. Ibid. 28 & 40, 1925.
Amaniteae SINGER, Ann. Myc. XXXIV, 352, 1936.
Lepioteae SINGER, Ibid. 353, 1936.

Fructificatio volvata vel annulata vel volvata annulataque. Pileus a stipite discretus separabilisque. Lamellae vulgo liberae, molles.

Key to the genera in Tribe Amaniteae.

1. Fructification with volva and annulus........................... *Amanita.*
2. Fructification with volva, without annulus.................. *Amanitopsis.*
3. Fructification with annulus, without volva...................... *Lepiota.*

Amanita (PERS. ex FR.) QUÉL. emend. ROZE

Bull. Soc. Bot. Fr. XXIII, 51 & 114, 1876.

Amanita PERS. Syn. Fung. 246, 1801, p. p.

Agaricus § *Amanita* FR. Syst. Myc. I, 12, 1821, p. p.

Amanita QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 60 & 65, 1872, p. p.

Venenarius EARLE, Bull. N. Y. Bot. Gard. V, 450, 1909.

Leucomyces EARLE, Ibid. V, 451, 1909.

Fructification with volva and annulus. Pileus fleshy, regular, distinct from stipe. Stipe central, fleshy. Partial veil remaining as a membranous, persistent or rarely fugacious, adnate annulus when matured. Universal veil remaining as a membranous, free or adnate and persistent, or powdery friable volva at the base of stipe and patches or warts on the pileus when matured. Lamellae free, rarely subadnate or subdecurrent by a tooth. Spores white in mass.

Type species: *Agaricus phalloides* FR.

Key to the sections and species in Hokkaido.

I. Universal veil forming a large, deep and free cup-shaped volva at the base of stipe.. Sect. Volvatae.

  A. Pileus, lamellae and stipe white.

    1. Pileus at first conical then expanded to subumbonate; stipe evidently squamulose............................ *A. virosa*(1).
    2. Pileus at first semiglobose then expanded to obtuse convex; stipe smooth or fibrous.................................... *A. verna*(2).

  B. Pileus yellow, orange or scarlet.

    1. Pileus scarlet or orange; lamellae bright yellow; stipe and annnlus yellow or bright orange......................... *A. Caesarea*(3).
    2. Pileus yellow or yellowish brown; lamellae and annulus white; stipe white or yellowish and with yellowish brown colored squamules.................................... *A. subjunquillea*(4).

  C. Pileus gray, brown or bluish brown.

    1. Pileus even or very shortly striate............. *A. phalloides*(5).
    2. Pileus long striate......................... *A. longistriata*(6).

II. Universal veil forming a circumscissile, shallow and thick volva or subvolvate volva.. Sect. Semilimbatae.
   A. Pileus sulphur-yellow or yellowish.................... *A. mappa* (7).
   B. Pileus gray to brown............................. *A. porphyria* (8).

III. Universal veil usually forming several concentric encircled rings on the bulbous base of stipe and numerous warts on the pileus.. Sect. Marginatae.
   A. Pileus whitish or grayish; warts large, thick, pyramidal and separable; stipe fusiformly rooted........................... *A. solitaria* (9).
   B. Pileus scarlet, rarely orange; lamellae and annulus white; stipe white, rarely yellowish................................ *A. muscaria* (10).
   C. Pileus brownish or dark-brown.
      1. Pileus striate; spores ellipsoidal............. *A. pantherina* (11).
      2. Pileus not striate; spores globose............... *A. sepiacea* (12).

IV. Universal veil forming very fugacious, thin, powdery layer or warts on the base of stipe and on the pileus...................... Sect. Incompletae.
   A. Pileus yellow or brownish yellow.
      1. Pileus small, 2.5–5 cm. broad, yellow or light orange; stipe white with yellowish powders........................ *A. pulchella* (13).
      2. Pileus medium in size, 6.5 cm. broad, brownish yellow; stipe yellow. .... *A. flavipes* (14).
   B. Pileus brownish, brown, reddish brown or dark brown.
      1. Universal veil yellow-powdery.................... *A. aspera* (15).
      2. Universal veil gray-powdery; spores broadly ellipsoidal or subglobose.
         a. Pileus brownish or reddish brown; flesh at first white, becoming reddish when bruised..................... *A. rubescens* (16).
         b. Pileus brown or dark brown; flesh white, not changing in color. .... *A. spissa* (17).
      3. Universal veil dark brown-powdery; pileus grayish brown or dark brown; flesh white, not changing in color; stipe evidently scaly below the annulus; spores globose.............. *A. spissacea* (18).

Sect. Volvatae SCHROET.

Pilze Schles. I, 680, 1889.

Limbatae GILBERT, Genre Amanita, 17, 1918.

Universal veil forming a large, deep, free and persistent cup-shaped volva.

1. *Amanita virosa* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 66, 1872—GILL. Hymen. Fr. 38, 1874—KARST. Hattsv. I, 1, 1879—SACC. Syll. Fung. V, 9,

1887; Fl. Ital. Crypt., Hymen. 55, 1915—BARLA, Champ. Alp. Marit. 11, pl. 3, f. 1–4, 1888—BOUD. Bull. Soc. Myc. Fr. XVIII, 258, 1902—KAWAMURA, Ill. Jap. Fung. pl. 2, f. 1–3, 1912—LANGE, Agar. Denm. II, 7, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 83, 1917—GILBERT, Bull. Soc. Myc. Fr. XLI, 288, 1925—KONR. & MAUBL. Icon. Sel. Fung. 33, pl. 1, 1927.

[YASUDA, Bot. Mag. (Tokyo), XXX, (51), 1916—SHIRAI, List Jap. Fung. ed. 2, 43, 1917; Ibid. ed. 3, 19, 1927—IMAI, Bot. Mag. (Tokyo), XLVII, 424, 1933]

Agaricus (Amanita) virosus FR. Epicr. Myc. 3, 1838; Hymen. Eur. 18, 1874.

Amanita phalloides subsp. *virosa* GILBERT, Genre Amanita, 52, 1918—VESELÝ, Ann. Myc. XXXI, 227, 1933.

Solitary or scattered, deadly poisonous. Pileus 6–15 cm. broad, conical, then campanulate, at length expanded to subumbonate; surface smooth, glabrous, viscid when wet, shining when dry, pure white, usually without patches of the fragments of volva and without any innate fibrils, even and not striate on the margin; context white, taste and odour none; lamellae free, white, crowded, ventricose, thin, floccose or fimbriate on the edge; stipe 8–25 cm. long, 8–25 mm. thick, nearly equal or slightly attenuated upward, enlarged or subbulbous at the base, split up into longitudinal fibrils and floccosely squamulose, white, hollow; annulus apical, membranous, ample, white, radially striate above, downy floccose on the under surface, persistent; volva white or yellowish, torn at the apical portion, membranous, persisting as a large sheathing cup, up to 5 cm. broad and 6 cm. high; spores white in mass, hyaline, smooth, subglobose or globose, 8–10 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo, Foot of Mt. Taisetsu), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Europe and North America.

Jap. name. *Doku-tsurutake* (KAWAMURA).

2. *Amanita verna* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 230, 1872—GILL. Hymen. Fr. 37, 1874—W. G. SM. Brit. Basid. 15, 1908—ROLLAND, Atlas Champ. 13, f. 4, 1910—RICKEN, Blätterp. 307, 1915, p. p.—SACC. Fl. Ital. Crypt., Hymen. 56, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 30, pl. 15, 1917—KAUFFM. Agar. Mich. 602, pl. 116, 1918.

[IMAI, Bot. Mag. (Tokyo), XLVII, 424, 1933]

Agaricus bulbosus SCHAEFF. Fung. Bavar. IV, Ind. 61, pl. 241, 1774 (teste FR.).

Agaricus bulbosus, vernus BULL. Champ. Fr. pl. 108, 1791 (teste FR.).
Amanita verna PERS. Syn. Fung. 250, 1801.
Agaricus vernus DC. Fl. Fr. II, 210, 1815.
Agaricus (Amanita) vernus FR. Syst. Myc. I, 13, 1821.
Agaricus (Amanita) virosus var. *vernus* FR. Epicr. Myc. 4, 1838.
Agaricus (Amanita) phalloides var. *vernus* FR. Hymen. Eur. 18, 1874.
Amanita phalloides var. *verna* BARLA, Champ. Alp. Marit. 12, pl. 1, f. 7–9, 1888.
Amanita bulbosa var. *albida* SCHROET. Pilze Schles. I, 681, 1889.
Amanita bisporigera ATKINS. Bot. Gaz. XLI, 348, 1906.
Amanita phalloides subsp. *verna* GILBERT, Genre Amanita, 49, 1918—VESELÝ, Ann. Myc. XXXI, 225, pl. 11, f. sinistra, pl. 12–13, 1933.
Amanita phalloides var. *verna* REA, Brit. Basid. 98, 1922.

Solitary or scattered, deadly poisonous. Pileus 4–10 cm. broad, semiglobose, then convex, finally expanded, obtuse; surface viscid when wet, glabrous or slightly streaked on the marginal zone with innate fibrils, pure white or scarcely colored with yellowish tint at the center, usually without patches of the fragments of volva, even on the margin; context white, taste and odour almost none; lamellae free, not broad, crowded, subventricose, white, flocculose or fimbriate on the edges; stipe 6–15 cm. long, 0.5–1.5 cm. thick, equal or slightly tapering upwards, subbulbous at the base, pure white, silky shining, subglabrous or subfloccose, uneven, stuffed or nearly hollow; annulus ample, apical, white, membranous, thin, reflexed, usually persistent, substriate or flocculose above, nearly smooth or flocculose below; volva white or yellowish, membranous, ensheathing the base of stipe, torn at the apical portion, thick below, thinning out toward lobed margin, forming an ample deep cup; spores white in mass, hyaline, globose or subglobose, 6–10 μ in diam.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo), Iburi (Lake side of Tôya, Lake side of Shikotsu), Oshima (Ônomura).

Distr. Japan (Hokkaido), Europe, North America and Australia.

Jap. name. *Shiro-tamagotengutake* (IMAI).

3. *Amanita Caesarea* (SCOP. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 66, 1872; Ench. Fung. 2, 1886—GILL. Hymen. Fr. 33, 1874—KARST. Hattsv. I, 1, 1879—

SACC. Syll. Fung. V, 8, 1887; Fl. Ital. Crypt., Hymen. 53, 1915—BARLA, Champ. Alp. Marit. 9, 1888—ATKINS. Mushrooms, ed. 2, 70, f. 72, 1903—ROLLAND, Atlas Champ. 10, f. 1, 1910—KAWAMURA, Ill. Jap. Fung. pl. 7, f. 15–17, 1913—RICKEN, Blätterp. 307, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 19, pl. 10–11, 1917—GILBERT, Genre Amanita, 18, 1918—SART. et MAIRE, Comp. Hym. Amanita, 159, 1922—BRES. Icon. Myc. I, pl. 1, 1927—VESELÝ, Ann. Myc. XXXI, 214, 1933.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 130, 1904—SHIRAI, List Jap. Fung. 8, 1905; Ibid. ed. 2, 41, 1917; Ibid. ed. 3, 17, 1927—YASUDA, Bot. Mag. (Tokyo), XXXIV, (68), 1920—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 119, 1931—IMAI, Bot. Mag. (Tokyo), XLVII, 423, 1933]

Agaricus Caesareus SCOP. Fl. Carn. ed. 2, II, 419, 1772 (teste FR.).

Agaricus aureus BATSCH, Elench. Fung. 57, 1783 (teste FR.).

Amanita caesarea PERS. Syn. Fung. 252, 1801.

Amanita aurantiaca PERS. Ibid. 252, 1801 (teste FR.).

Agaricus (Amanita) Caesareus FR. Syst. Myc. I, 15, 1821; Epicr. Myc. 3, 1838; Hymen. Eur. 17, 1874—WINT. Die Pilze, I, 851, 1884.

Amanita pellucida BANN. et PK. 44 Ann. Rep. N. Y. State Mus. 178, 1892 (teste MURRILL).

Venenarius Caesareus MURRILL, Mycologia, V, 73, 1913; North Amer. Fl. X, 69, 1914.

Solitary or scattered, edible. Pileus 5.5–18 cm. broad, ovate or bell shaped, then umbonate, at length the margin of pileus upturned; surface dark scarlet, orange or yellow, rarely pale-yellow, darker at the center, lighter colored and strongly striate on the margin, smooth, subviscid when wet, shining when dry, occasionally provided with patches from the volva; context moderately thick, whitish or yellowish, under the pellicle at the center tinged with a reddish orange color, taste mild, odour none; lamellae free, subcrowded or subdistant, bright yellow, broader in front, edge entire or slightly wavy; stipe 10–17 cm. long, 6–20 mm. thick, slightly attenuated upward, not bulbous at the base, yellow, light orange or yellowish, silky, shining, slightly floccose, stuffed then hollow; annulus ample, yellowish or light orange, membranous, thin, apical, reflexed, persistent; volva whitish, reaching to 5 cm. high, membranous, forming a large, ample, free cup with lobed or toothed margin, free for upper four-fifths, persistent; spores white in mass, hyaline, ellipsoidal, smooth, 8–12 × 6–7 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo, Atsubetsu, Foot of Mt. Taisetsu), Iburi (Lake side of Shikotsu), Kushiro (Mt. Meakan).

Distr. Japan (Hokkaido, Honshu), Hymaraya, Asia Minor, Europe, Tunisia and North America.

Jap. name. *Tamagotake* (KAWAMURA), *Ô-benitake* (SHIRAI ex P. HENNINGS).

4. *Amanita subjunquillea* IMAI

Bot. Mag. (Tokyo), XLVII, 424, 1933.

Solitary or scattered, edibility doubtful. Pileus 3–7 cm. broad, conical-convex, then nearly plane; surface smooth, glabrous, slightly viscid when wet, slightly silky shining when dry, anilin-yellow or yellow-ocher colored at the center, lighter and even or sometimes slightly striatulate on the margin, often provided with white floccose patches of the fragments of volva; context white, yellow under the pellicle, rather thin, taste and odour none; lamellae free, white, subcrowded, edge not entire; stipe 6–11 cm. long, 6–10 mm. thick, attenuated upward or nearly equal, subbulbous at the base, dry, fibrous, whitish or yellowish, with yellowish or brownish small fibrous scales, nearly solid; annulus apical, membranous, thin, white and striate above, yellowish below, persistent; volva white or brownish, torn at the apex in irregular 2–3 lobes, sheathing the base of stipe, membranous, thick below, thinning out toward lobed margin, up to 3 cm. long, 2.5 cm. thick; spores white in mass, hyaline, globose or subglobose, 7–8 μ or $7.5 \times 7\ \mu$, with a granular content.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo, Sapporo).

Distr. Endemic (Hokkaido & Northern Honshu).

Jap. name. *Tamagotake-modoki* (IMAI).

5. *Amanita phalloides* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 67, 1872; Ench. Fung. 2, 1886—SACC. Syll. Fung. V, 9, 1887, p. p.—MASS. Brit. Fung. Fl. III, 260, 1893, p. p.—ATKINS. Mushrooms, ed. 2, 55, f. 55–58, 1903—W. G. SM. Brit. Basid. 15, 1908—ROLLAND, Atlas Champ. 12, f. 3, 1910—KAWAMURA, Ill. Jap. Fung. pl. 7, f. 24–25, 1913—RICKEN, Blätterp. 307, pl. 75, f. 2, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 27, pl. 14, 1917—GILBERT, Genre Amanita, 38, 1918—KAUFFM. Agar. Mich. 600, 1918—REA, Brit. Basid. 98, 1922—BRES. Icon. Myc. I, pl. 3, 1927—VESELÝ, Ann. Myc. XXXI, 222, 1933, excl. subspp.

[KAWAMURA, Bot. Mag. (Tokyo), XXIII, (463), 1909—SHIRAI, List Jap. Fung. ed. 2, 43, 1917; ed. 3, 18, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 119, 1931—IMAI, Bot. Mag. (Tokyo), XLVII, 424, 1933]

Agaricus bulbosus BULL. Champ. Fr. pl. 2, 1791 (teste FR.).

Amanita viridis PERS. Tent. Disp. Fung. 67, 1797; Syn. Fung. 251, 1801 (teste FR.).

Amanita venenosa var. *viridis* PERS. Traite Champ. 181, 1819.

Agaricus verrucosus DC. Fl. Fr. II, 209, 1815, pro parte.

Agaricus (Amanita) Phalloides FR. Syst. Myc. I, 13, 1821, pro maj. parte; Epicr. Myc. 4, 1838, pro maj. parte; Hymen. Eur. 18, 1874, pro maj. parte—CKE. Ill. Brit. Fung. pl. 2, 1883—WINT. Die Pilze, I, 850, 1884.

Agaricus virescens KROMBH. Abbil. Schwamm. IV, 19, pl. 28, f. 1–3, 1836.

Agaricus viridis KROMBH. Ibid. IX, 22, pl. 69, f. 10–17, 1845.

Amànita bulbosa GILL. Hymen. Fr. 36, 1874, p. p.—KARST. Hattsv. I, 2, 1879, p. p.—SCHROET. Pilze Schles. I, 681, 1889, p. p.—SACC. Fl. Ital. Crypt., Hymen. 57, 1915.

Venenarius phalloides MURRILL, Mycologia, IV, 240, 1912; Ibid. V, 74 & 93, pl. 87, f. 1, 1913, p. p.; North Amer. Fl. X, 70, 1914, p. p.

Solitary or scattered, deadly poisonous. Pileus 8–18 cm. broad, ovate-campanulate, then convex to expanded, becoming nearly umbonate; surface smooth, subviscid when wet, silky shining when dry, glabrous or rarely provided with white fragments of volva, olive-brown, brown or gray, usually darker at the center, lighter colored and even or rarely striatulate on the margin, the pellicle easily separable; context white, moderately thick, taste and odour almost none; lamellae free or remote, white, ventricose, broader in front, close, entire or slightly wavy on the edges; stipe 10–32 cm. long, 1–3 cm. thick, attenuated upward, bulbous at the base, white, smooth or besprinkled with small cracks which appear to be small silky floccose-scales, stuffed or hollow; annulus white, membranous, thin, superior, reflexed, striate above, persistent; volva large, white or yellowish, free for half its depth, up to 11 cm. high, 6 cm. wide, splitting up into 3–4 limbs, persistent; spores white in mass, hyaline, smooth, globose, 9–10.5 μ, with a large central gutta.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo, Mt. Teine, Sôunbetsu).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe and North America.

Jap. name. *Tamago-tengutake* (KAWAMURA).

6. *Amanita longistriata* IMAI, sp. nov.

Solitaria. Pileo 5–10 cm. lato, convexo, dein plano, viscido, subfuligineo (drab, buffy-brown or clove-brown), glabro, margine palli-

diore longe striato; carne alba, subtenui, odore saporeque nullo; lamellis liberis, confertis, albis, demum subcarnescentibus; stipite *10–18 cm. longo, 8–15 mm. crasso, sursum attenuato,* basi non bulboso, albo, subglabro vel floccoso-squamuloso, e farcto cavo; annulo superno, albo, amplo, membranaceo; volva vaginata, laxa, alba, 2–5 cm. longa, 1–3.5 cm. crassa; sporis in cumulo albis, globosis vel subglobosis, levibus, 12.5–15 × 10–12.5 μ.

Hab. on the ground among grasses under trees. Late summer (Aug.). Ishikari (Sapporo).

Distr. Endemic.

Jap. name. *Tamagotengutake-modoki* (n. n.).

The present fungus closely resembles *Amanita phalloides* (FR.) QUÉL. from which it is distinguishable in the long striate pileus and not bulbous at the base of stipe, as well as in the larger spores.

Sect. **Semilimbatae** GILBERT

Genre Amanita 61, 1918.

Universal veil forming a circumscissile, shallow and thick volva or subvolvate volva.

7. ***Amanita mappa*** (BATSCH ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 67, 1872—SACC. Syll. Fung. V, 10, 1887; Fl. Ital. Crypt., Hymen. 52, 1915—MASS. Brit. Fung. Fl. III, 261, 1893—W. G. SM. Brit. Basid. 15, 1908—ROLLAND, Atlas Champ. 14, f. 5, 1910—KAWAMURA, Ill. Jap. Fung. pl. 7, f. 21–23, 1913—RICKEN, Blätterp. 309, pl. 77, f. 2, 1915—KAUFFM. Agar. Mich. 609, 1918—BRES. Icon. Myc. I, pl. 7, 1927.

[YASUDA, Bot. Mag. (Tokyo), XXIX, (117), 1915—SHIRAI, List Jap. Fung. ed 2, 41, 1917; ed. 3, 18, 1927—IMAI, Bot. Mag. (Tokyo), XLVII, 425, 1933]

Agaricus Mappa BATSCH, Elench. Fung. 57, 1783 (teste FR.).

Amanita citrina β *Mappa* PERS. Syn. Fung. 251, 1801.

Agaricus (Amanita) Mappa FR. Epicr. Myc. 6, 1838; Hymen. Eur. 19, 1874—CKE. Ill. Brit. Fung. pl. 4, 1881—WINT. Die Pilze, I, 849, 1884.

Amanita venenosa GILL. Hymen. Fr. 44, cum icone, 1874—KARST. Hattsv. I, 2, 1879.

Solitary or scattered, poisonous. Pileus 3–8 cm. broad, hemiglobose, then convex, expanded to nearly plane; surface dry, silky, nearly sulphur-yellow, then slightly paler, besprinkled with patches

of the fragments of volva, of which the color is sordid white, light brownish or sulphur-yellow, usually entire and not striate on the margin; context rather thin, whitish, fragile, taste and odour none; lamellae free, white, close, minutely serrulate on the edge; stipe 5–12 cm. long, 5–15 mm. thick, slightly attenuated upward or nearly equal, marginately bulbous at the base, yellowish or whitish, with sulphur-yellow colored fibrils, silky shining, often besprinkled with small sulphur-yellow colored scales on the basal part, solid; annulus membranous, sulphur-yellow and smooth above, tomentose below, superior, rather ample, thickened toward the margin, persistent; volva white or sordid white external, sulphur-yellow internal, thick, shallow, fragile, obtuse at the edge, evanescent, leaving a distinct groove around the base of stipe; spores white in mass, hyaline, globose, apiculate, 7.5–10 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America and Australia.

Jap. name. *Ko-tamagotengutake* (KAWAMURA).

8. *Amanita porphyria* (ALB. et SCHW. ex FR.) GILL.

Hymen. Fr. 35, 1874—QUÉL. Ench. Fung. 2, 1886—SACC. Syll. Fung. V, 11, 1887; Fl. Ital. Crypt., Hymen. 54, 1915—KARST. Hattsv. I, 2, 1879; Finl. Basidsv. 38, 1889—BARLA, Champ. Alp. Marit. 12, pl. 3, f. 5–6, 1888—SCHROET. Pilze Schles. I, 680, 1889—W. G. SM. Brit. Basid. 15, 1908—LANGE, Agar. Denm. II, 8, 1915—RICKEN, Blätterp. 308, pl. 75, f. 3, pl. 76, f. 1, 1915—GILBERT, Genre Amanita, 54, 1918; Bull. Soc. Myc. Fr. XL, 212, pl. 11, 1925—KAUFFM. Agar. Mich. 604, pl. 117, 1918—REA, Brit. Basid. 99, 1922—SART. & MAIRE, Comp. Hym. Amanita. 349, 1922—BRES. Icon. Myc. I, pl. 6, 1927—KONR. & MAUBL. Icon. Sel. Fung. I, 34, pl. 3, 1929—VESELÝ, Ann. Myc. XXXI, 233, 1933.

[MATSUURA, Fungi, I, 96, 1931—IMAI, Bot. Mag. (Tokyo), XLVII, 425, 1933]

Amanita porphyria ALB. et SCHW. Consp. Fung. Lusat. 142, pl. 11, f. 1, 1805 (teste FR.).

Agaricus (Amanita) porphyria FR. Syst. Myc. I, 14, 1821; Epicr. Myc. 4, 1838; Hymen. Eur. 19, 1874—WINT. Die Pilze, I, 849, 1884.

Agaricus (Amanita) recutitus FR. Epicr. Myc. 6, 1838; Hymen. Eur. 19, 1874—WINT. Die Pilze, I, 849, 1884.

Amanita recutita GILL. Hymen. Fr. 42, 1874—KARST. Hattsv. 3, 1879—QUÉL. Ench. Fung. 3, 1886—SACC. Syll. Fung. V, 11, 1887—BARLA, Champ. Alp. Marit. 13, pl. 8, f. 1–4, 1888—RICKEN, Blätterp. 309, 1915—REA, Brit. Basid. 99, 1922.

Amanita porphyria var. *recutita* QUÉL. Fl. Myc. 308, 1888—LANGE, Agar. Denm. II, 8, 1915.

Venenarius porphyrius MURRILL, Mycologia, V, 81, 1913; North Amer. Fl. X, 70, 1914.

Amanita porphyria f. *recutita* VESELÝ, Ann. Myc. XXXI, 235, 1933.

Solitary or scattered, poisonous. Pileus 5–8 cm. broad, conical or convex, then plane; surface avellaneous to drab or brown, moist or dry, subglabrous or flocculose, provided with whitish to avellaneous colored cottony patches of the fragments of volva, margin slightly incurved and not striate; context white, odour and taste almost none; lamellae nearly free, white, broader in front; stipe 9–13 cm. long, 6–10 mm. thick, equal or slightly attenuated upward, globosely bulbous at the base, whitish to avellaneous, silky above the annulus, stuffed or hollow; annulus membranous, drab-gray to sooty-black colored, superior, persistent; volva whitish or brownish, subvolvate or leaving a groove around the base of stipe; spores white in mass, hyaline, globose, 10–12.5 μ (*in alcohol specimen*).

Hab. *on the ground in woods. Summer to autumn. Ishikari* (*Mt. Teine*), *Kushiro* (*Mt. Meakan*).

Distr. *Japan* (*Hokkaido, Honshu*), *Asia Minor, Europe and North America*.

Jap. name. *Kotengutake* (MATSUURA).

Sect. **Marginatae** SCHROET.

Pilze Schles. I, 679, 1889.

Universal veil *usually forming several concentric encircled rings on the bulbous base of stipe and numerous warts on the pileus.*

9. ***Amanita solitaria*** (BULL. ex FR.) KARST.

Hattsv. I, 4, 1879—QUÉL. Ench. Fung. 3, 1886—SACC. Syll. Fung. V, 15, 1887; Fl. Ital. Crypt., Hymen, 51, 1915—BARLA, Champ. Alp. Marit. 15, pl. 4, f. 5–8, 1888—SCHROET. Pilze Schles. I, 679, 1889—MASS. Brit. Fung. Fl. III, 265, 1893—ATKINS. Mushrooms, ed. 2, 72, f. 75–76, 1903—W. G. SM. Brit. Basid. 16, 1908—ROLLAND, Atlas Champ. 17, f. 12, 1910—RICKEN, Blätterp. 312, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 68, pl. 45–47, 1917—GILBERT, Genre Amanita, 89, 1918—KAUFFM. Agar. Mich. 614, 1918—REA, Brit. Basid. 101, 1922—BRES. Icon. Myc. I, pl. 11, 1927.

Agaricus solitarius BULL. Champ. Fr. pl. 48, 1791 (teste FR.).

Hypophyllum pellitum PAULET, Traite Champ. pl. 156bis, 1793 (teste FR.).

Agaricus nitidus FR. Obs. Myc. I, 4, 1815.

Agaricus (Amanita) solitarius FR. Syst. Myc. I, 17, 1821; Epicr. Myc. 6, 1838; Hymen. Eur. 22, 1874—WINT. Die Pilze, I, 846, 1884.

Agaricus strobiliformis VITT. Fung. Mang. 59, 1835—FR. Epicr. Myc. 5, 1838; Hymen. Eur. 21, 1874—CKE. Ill. Brit. Fung. I, pl. 277, 1883—WINT. Die Pilze, I, 847, 1884.

Agaricus (Amanita) nitidus FR. Epicr. Myc. 8, 1838; Hymen. Eur. 24, 1874—WINT. Die Pilze, I, 845, 1884.

Agaricus polypyramis BERK. et CURT. Ann. Mag. Nat. Hist. 2 ser. XII, 417, 1853 (teste MURRILL).

Agaricus monticulosus BERK. et CURT. Ibid. XII, 418, 1853 (teste MURRILL).

Agaricus (Amanita) daucipes BERK. et MONT. in MONT. Syll. Crypt. 96, 1856 (teste MURRILL).

Agaricus (Amanita) Ravenelii BERK. et CURT. Ann. Nat. Hist. 3 ser. IV, 1, 1859 (teste MURRILL).

Amanita strobiliformis QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 68, 1872; Ench. Fung. 3, 1886—GILL. Hymen. Fr. 43, 1874—SACC. Syll. Fung. V, 15, 1887; Fl. Ital. Crypt., Hymen. 50, 1915—BARLA, Champ. Alp. Marit. 15, pl. 4bis, 1888—MASS. Brit. Fung. Fl. III, 264, 1893—W. G. SM. Brit. Basid. 16, 1908—RICKEN, Blätterp. 311, pl. 81, f. 1, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 73, pl. 50–53, 1917—GILBERT, Genre Amanita, 93, 1918—REA, Brit. Basid. 101, 1922—VESELÝ, Ann. Myc. XXXI, 247, 1933.

[MATSUM. Ind. Pl. Jap. I, 131, 1904—SHIRAI, List Jap. Fung. ed. 2, 43, 1917; ed. 3, 18, 1927]

Amanita nitida QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 69, 1872—GILL. Hymen. Fr. 49, cum icone, 1874—KARST. Hattsv. I, 6, 1879—SACC. Syll. Fung. V, 18, 1887; Fl. Ital. Crypt., Hymen. 47, 1915—BARLA, Champ. Alp. Marit. 16, pl. 6, f. 1–3, 1888—MASS. Brit. Fung. Fl. III, 266, 1893—W. G. SM. Brit. Basid. 17, 1908—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 87, pl. 69, 1917—REA, Brit. Basid. 104, 1922.

Amanita pellita GILL. Hymen. Fr. 43, cum icone, 1874.

Agaricus (Amanita) onustus HOWE, Bull. Torrey Bot. Club, V, 42, 1874 (teste MURRILL).

Amanita prairiicola PK. Bull. Torrey Bot. Club, XXIV, 138, 1897 (teste MURRILL).

Amanita multisquamosa PK. 53 Ann. Rep. N. Y. State Mus. 840, 1900 (teste MURRILL).

Amanita radicata PK. Bull. Torrey Bot. Club, XXVII, 609, 1900 (teste MURRILL).

Amanita cinereoconia ATKINS. Ann. Myc. VII, 366, 1909 (teste MURR.).

Venenarius solitarius MURRILL, Mycologia, IV, 240, 1912; North Amer. Fl. X, 76, 1914.

Amanita strobiliformis var. *nitida* GILBERT, Genre Amanita, 95, 1918.

Solitary, edible. Pileus 6–15 cm. broad, globose, then convex, finally depressed at the center; surface dry, white or gray, covered

with thick separable, angular, pyramidal, gray, wart-like fragments of volva, appendiculate and striate on the margin; context white, rather soft, taste and odour pleasant; lamellae free, decurrent by a tooth, white or tinged with cream color, crowded, narrow, often fimbriate on the edges; stipe 7–15 cm. long, 1–3 cm. thick, nearly equal or slightly attenuated upward, base bulbous and fusiformly rooted, white or whitish, at first covered with thick, floccose or farinose, imbricate large scales, which later become smaller and scattered, solid; annulus apical, white then dingy yellowish, pendulous, submembranous, striate above, floccose below, often torn, finally disappearing; volva white or grayish, at first concentrically arranged on the base of the stipe with thick, pointed, large, friable powdery scales, then evanescent; spores white in mass, ellipsoidal, 9–13 × 7–9 μ.

Hab. on the ground in woods. Summer to autumn. Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), China, Europe, North America and Australia.

Jap. name. *Uroko-tengutake* (IMAI).

10. *Amanita muscaria* (L. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 67, 1872; Ench. Fung. 3, 1886—GILL. Hymen. Fr. 39, cum icone, 1874—KARST. Hattsv. I, 3, 1879—SACC. Syll. Fung. V, 13, 1887; Fl. Ital. Crypt., Hymen. 48, 1915—BARLA, Champ. Alp. Marit. 14, 1888—SCHROET. Pilze Schles. I, 680, 1889—MASS. Brit. Fung. Fl. III, 262, 1893—ATKINS. Mushrooms, ed. 2, 52, f. 52–54, 1903—W. G. SM. Brit. Basid. 16, 1908—ROLLAND, Atlas Champ. 14, pl. 5, 1910—KAWAMURA, Ill. Jap. Fung. pl. 2, f. 14–18, 1912—RICKEN, Blätterp. 311, pl. 79, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 49, pl. 27–28, 1917—GILBERT, Genre Amanita, 81, 1918—KAUFFM. Agar. Mich. 610, 1918—REA, Brit. Basid. 100, 1922—BRES. Icon. Myc. I, pl. 8, 1927—VESELÝ, Ann. Myc. XXXI, 250, 1933.

[TANAKA, Bot. Mag. (Tokyo), III, (50), 1889—SHIRAI, Bot. Mag. (Tokyo), III, (156), 1889; List Jap. Fung. 8, 1905; ed. 2, 43, 1917; ed. 3, 18, 1927—P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 131, 1904—YASUDA, Bot. Mag. (Tokyo), XXVIII, (476), 1914—UMEMURA, Pl. Fujiyama. 365, 1923—IMAI, Bot. Mag. (Tokyo), XLVII, 425, 1933]

Agaricus muscarius L. Sp. Pl. 1172, 1753 (teste FR.).

Amanita muscaria PERS. Syn. Fung. 253, 1801 (teste FR.).

Agaricus (Amanita) muscarius FR. Syst. Myc. I, 16, 1821; Epicr. Myc. 5, 1838; Hymen. Eur. 20, 1874—BARLA, Champ. Nice, 6, pl. 2, 1859—CKE. Ill. Brit. Fung. pl. 117, 1883—WINT. Die Pilze, I, 848, 1884.

Solitary or gregarious, poisonous. Pileus 6–15 cm. broad, globose, then convex to plane, at length depressed at the center; surface scarlet, dark scarlet or reddish orange, becoming pale scarlet when old, slightly viscid when wet, short striate on the margin, provided with yellowish, three- or many-sided, pyramidal and easily separable warts; context white, reddish or yellowish under the pellicle, thick, taste and odour none; lamellae free or remote, white, becoming yellowish, broader in front, crowded, edge slightly wavy; stipe 10–24 cm. long, 6–30 mm. thick, attenuated upward, bulbous at the base, up to 4 cm. or more thick, white or pale yellowish, at first white floccose, becoming fibrous and striate when old, stuffed with cottony mass or hollow, fleshy, rigid; annulus membranous, white, superior, reflexed, yellow-marginate below; volva adnate, usually encircled with 3 to 6 subconcentric rings or rarely with a spiral ring, white or yellowish; spores white in mass, hyaline, subellipsoidal, 9–12 × 7.5–9 μ, with a large central gutta.

Hab. on the ground in woods. Summer to autumn. Ishikari (Mt. Teine, Atsubetsu, Mt. Kurodake), Kushiro (Akan).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America, Australia, and Africa.

Jap. name. *Benitengutake* (Kawamura), *Ashitakabenitake* (Shirai).

11. *Amanita pantherina* (DC. ex Fr.) Quél.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 68, 1872; Ench. Fung. 3, 1886—Gill. Hymen. Fr. 41, cum icone, 1874—Karst. Hattsv. I, 3, 1879—Sacc. Syll. Fung. V, 14, 1887; Fl. Ital. Crypt., Hymen. 49, 1915—Barla, Champ. Alp. Marit. 15, pl. 3, f. 1–4, 1888—Mass. Brit. Fung. Fl. III, 261, 1893—W. G. Sm. Brit. Basid. 16, 1908—Rolland, Atlas Champ. 16, f. 10, 1910—Kawamura, Ill. Jap. Fung. pl. 16, f. 13–15, 1915—Lange, Agar. Denm. II, 9, 1915—Ricken, Blätterp. 309, pl. 78, f. 1, 1915—Gilbert, Genre Amanita, 104, 1918—Rea, Brit. Basid. 103, 1922—Bres. Icon. Myc. I, pl. 13, 1927—Vésel\'y, Ann. Myc. XXXI, 270, 1933.

[Tanaka, Bot. Mag. (Tokyo), II, (170), 1888; Ibid. III, (50), 1889; Mycogr. Nippon. I, No. 1, Pt. 1, pl. 1, 1890—Kawamura, Bot. Mag. (Tokyo), XXIII, (461), 1909—Umemura, Pl. Fujiyama. 365, 1923—Matsuura & Kanada, Trans. Tottori Soc. Agr. Sci. III, 119, 1931—Imai, Bot. Mag. (Tokyo), XLVII, 426, 1933]

Amanita umbrina Pers. Syn. Fung. 254, 1801 (teste Fr.).

Agaricus pantherinus DC. Fl. Fr. VI, 52, 1815 (teste Fr.).

Agaricus (Amanita) pantherinus FR. Syst. Myc. I, 16, 1821; Epicr. Myc. 5, 1838; Hymen. Eur. 21, 1874—WINT. Die Pilze, I, 847, 1884.

Amanita umbrina SCHROET. Pilze Schles. I, 679, 1889.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 131, 1904]

Solitary, poisonous. Pileus 5–26 cm. broad, convex, then plane, at length slightly depressed at the center; surface cinnamon-buff, cinnamon-brown, snuff-brown or bister, paler at the margin, slightly viscid when wet, besprinkled with three to many sided or pyramidal, easily separable, whitish or yellowish warts, or with whitish patches of the fragments of volva, margin striate or rarely tuberculate-striate; context white, taste and odour none; lamellae free, white, tapering to both ends, moderately crowded, edge not entire; stipe 5.5–35 cm. long, 1–3 cm. thick, attenuated upward or nearly equal, globosely bulbous at the base, white, then brownish, floccose or fibrous-scaly, stuffed or hollow; annulus median or subsuperior, membranous, white, then yellowish or brownish, persistent or somewhat fugacious; volva whitish or brownish, forming 1–3 concentric encircling rings at the apex of bulbous base of stipe; spores white in mass, hyaline, ellipsoidal, 9–12 × 6.5–9 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo, Mt. Kurodake), Kushiro (Mt. Meakan).

Distr. Japan (Hokkaido, Honshu), Europe and North America.

Jap. name. *Tengu-take* (KAWAMURA), *Haitoritake* (KAWAMURA), *Hyô-take* (TANAKA).

12. *Amanita sepiacea* IMAI

Bot. Mag. (Tokyo), XLVII, 426, 1933.

Solitary, edibility doubtful. Pileus 6–10 cm. broad, convex then plane; surface snuff-brown to mummy-brown, darker at the center, subviscid when wet, smooth, besprinkled with grayish or brownish, polygonal or pyramidal warts, not striate on the margin; context white, fleshy, rather thin, taste and odour none, not changing in color when bruised; lamellae scarcely free or somewhat adnate, white, tapering to both ends, crowded, edge not entire; stipe 15–18 cm. long, 1–1.5 cm. thick, attenuated upwards, obovately bulbous at the base, up to 3 cm. thick at the base, grayish to smoky gray or avellaneous-buff, fibrous or flocculose-squamulose, solid or stuffed; annulus mem-

branous, apical, white and striate above, drab-color below, persistent; volva forming 1–4 concentric encircling rings on the bulbous base of stipe, subpersistent or fugacious, whitish or brownish; spores white in mass, hyaline, globose or subglobose, 8–10 μ in diam.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Tengu-take-modoki* (IMAI).

Sect. **Incompletae** SCHROET.

Pilze Schles. I, 677, 1889.

Universal veil forming very fugacious, thin, powdery layer or warts on the base of stipe and on the pileus.

13. ***Amanita pulchella*** IMAI

Bot. Mag. (Tokyo), XLVII, 427, 1933.

Solitary or scattered, of doubtful edibility. Pileus 2.5–5 cm. broad, convex then plane, finally upturned at the margin; surface empire-yellow to apricot-yellow, lighter on the margin, viscid when wet, glabrous but besprinkled with egg-yellow powdery patches of the fragments of volva, shortly striate at the margin when old; context white, thin, taste and odour none; lamellae free, white, finally tinged with yellowish tint, rather crowded, ventricose-fusiform, narrow; stipe 8–10 cm. long, 4–7 mm. thick, slightly attenuated upward or nearly equal but slightly enlarged at the base, white or white with egg-yellow colored powders, stuffed; annulus membranous, superior, egg-yellow, persistent; volva egg-yellow colored powdery mass, surrounded at the base of the stipe, friable; spores white in mass, hyaline, broadly ellipsoidal, 7.5–10 × 5–6 μ.

Hab. on the ground in woods. Late summer. Ishikari (Nopporo).

Distr. Endemic

Jap. name. *Ko-koganetengutake* (IMAI).

14. ***Amanita flavipes*** IMAI

Bot. Mag. (Tokyo), XLVII, 428, 1933.

Solitary, of doubtful edibility. Pileus about 6.5 cm. broad, convex, then plane, at length slightly depressed at the center; surface buckthorn-brown at the center, paler at the margin, slightly viscid when wet, smooth, glabrous but besprinkled with sulphur-yellow colored small powdery masses of the fragments of volva, slightly short striatulate on the margin; context very thin, odour none; lamellae whitish or yellowish, free, floccose-serrulate on edge, rather close, broader in front; stipe about 10 cm. long, about 1 cm. thick, slightly attenuated upward or nearly equal but slightly enlarged at the base, buff-yellow or apricot-yellow colored powdery floccose below the annulus and becoming paler toward the base, warm-buff colored powdery scaly above the annulus, hollow; annulus membranous, superior, warm-buff and slightly striate above, persistent; volva pulverulent, surrounded at the base of stipe, apricot-yellow, empire-yellow or light cadomium, friable, fugacious; spores white in mass, hyaline, subglobose or broadly ellipsoidal, 8–9 × 6–7 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Koganetengutake* (IMAI).

15. *Amanita aspera* (FR. ?) QUÉL.

Ench. Fung. 4, 1886—BARLA, Champ. Alp. Marit. 17, 1888—SCHROET. Pilze Schles. I, 678, 1889—BOUD. Bull. Soc. Myc. Fr. XVIII, 266, 1902—ROLLAND, Atlas Champ. 16, f. 11, 1910—LANGE, Agar. Denm. II, 10, 1915—RICKEN, Blätterp. 314, pl. 80, f. 3, 1915—REA, Brit. Basid. 104, 1922—BRES. Icon. Myc. I, pl. 10, 1927—KONR. & MAUBL. Icon. Sel. Fung. I, pl. 8, 1930.

[MATSUM. Ind. Pl. Jap. I, 130, 1904—SHIRAI, List Jap. Fung. 8, 1905; ed. 2, 41, 1917; ed. 3, 17, 1927]

?*Agaricus* (*Amanita*) *asper* FR. Syst. Myc. I, 18, 1821; Hymen. Eur. 24, 1874.

Amanita virescens GILL. Hymen. Fr. 46, cum icone, 1874.

Solitary or scattered, poisonous. Pileus 2.5–8 cm. broad, convex or subconical, then subumbonate or plane; surface yellowish-brown, olive-brown or brown, lighter on the margin, dry, nearly smooth, provided with yellow or brownish colored polygonally or irregularly massed powdery or floccose warts, not striate at the margin; context white, rather thin, fleshy, brittle, taste and odour pleasant; lamellae white, free, crowded; stipe 4–8 cm. long, 3–10 mm. thick, attenuated upward, distinctly bulbous at the base, whitish or

brownish, floccose, subscaly above the annulus, stuffed then hollow; annulus whitish or brownish, membranous, superior; volva powdery, sulphur-yellow, becoming brownish, friable; spores white in mass, subglobose or subovate, 7.5–11 × 7–9.5 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo, Mt. Taisetsu), Kushiro (Akan).

Distr. Japan (Hokkaido, Honshu), Europe, and North America.

Jap. name. *Zaratsuki-tengutake* (SHIRAI).

Amanita aspera has been confused with the related species, *Am. spissa*, *Am. cariosa*, *Am. rubescens*, etc. There is some doubt whether FRIES' *Agaricus asper* is to be referred to our fungus.

16. *Amanita rubescens* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 69, 1872 —GILL. Hymen. Fr. 45, cum icone, 1874—KARST. Hattsv. I, 4, 1879—SACC. Syll. Fung. V, 16, 1887—BARLA, Champ. Alp. Marit. 17, pl. 5, f. 1–6, 1888—MASS. Brit. Fung. Fl. III, 265, 1893—ATKINS. Mushrooms, ed. 2, 71, f. 73–74, 1903—W. G. SM. Brit. Basid. 16, 1908—ROLLAND, Atlas Champ. 17, f. 13 (ut *rubens*), 1910—RICKEN, Blätterp. 313, pl. 80, f. 1, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 59, pl. 36–38, 1917—KAUFFM. Agar. Mich. 617, pl. 121, 1918—REA, Brit. Basid. 104, 1922—BRES. Icon. Myc. I, pl. 15, 1927.

[IMAI, Bot. Mag. (Tokyo), XLVII, 426, 1933]

Agaricus rubens SCOP. Fl. Carn. ed. 2, II, 416, 1772 (teste FR.).

Amanita rubescens PERS. Syn. Fung. 254, 1801 (teste FR.).

Agaricus (*Amanita*) *rubescens* FR. Syst. Myc. I, 18, 1821; Epicr. Myc. 7, 1838; Hymen. Eur. 23, 1874—CKE. Ill. Brit. Fung. pl. 9, 1883—WINT. Die Pilze, I, 846, 1884.

Amanita rubens QUÉL. Ench. Fung. 4, 1886—SACC. Fl. Ital. Crypt., Hymen. 44, 1915—GILBERT, Genre Amanita, 116, 1918—VESELÝ, Ann. Myc. XXXI, 240, 1933, p. p.

Amanita pustulata SCHROET. Pilze Schles. I, 678, 1889—RICKEN, Blätterp. 313, pl. 80, f. 1, 1915.

Solitary or scattered, edible. Pileus 6–18 cm. broad, convex, then plane, finally upturned at the margin; surface moist, light brownish-buff to dingy reddish-brown, darker at the center, provided with gray, mealy patches or three to many-sided subpyramidal and gray or reddish colored friable warts, even or slightly striatulate on the margin; context whitish, turning dull pinkish, thick at the center, thin at the margin, no taste and odour; lamellae free or remote, white, then spotted with reddish brown, rather close, soft; stipe

10–24 cm. long, 1–2.5 cm. thick, attenuated upward, obovately bulbous (up to 4.5 cm. thick) at the base, reddish-white, turning pinkish, dull-pinkish or light reddish-brown, squamulose above the annulus, fibrous below, stuffed or solid; annulus membranous, superior, whitish, avellaneous or wood-brown, turning to reddish or spotted with reddish brown, striate above, fugacious; volva powdery, gray or reddish, fugacious, mostly lacking on carelessly collected specimens; spores white in mass, hyaline, broadly ellipsoidal or subglobose. 7–9 × 5.5–7 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Sapporo, Nopporo), Iburi (Lake side of Shikotsu), Kushiro (Akan).

Distr. *Japan (Hokkaido, Honshu), Asia Minor, Europe, North* America and Australia.

Jap. name. *Irogawari-tengutake* (IMAI), *Gan-take* (KAWAMURA).

17. *Amanita spissa* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 69, 1872; Ench. Fung. 4, 1886—GILL. Hymen. Fr. 47, cum icone, 1874—KARST. Hattsv. I, 5, 1879—SACC. Syll. Fung. V, 17, 1887; Fl. Ital. Crypt., Hymen. 47, 1915—BARLA, Champ. Alp. Marit. 17, pl. 5, f. 7–11, 1888—SCHROET. Pilze Schles. I, 678, 1889—MASS. Brit. Fung. Fl. III, 266, 1893—W. G. SM. Brit. Basid. 16, 1908—ROLLAND, Atlas Champ. 16, f. 9, 1910—RICKEN, Blätterp. 313, pl. 80, f. 2, 1915—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 53, pl. 30–31, 1917—GILBERT, Genre Amanita, 108, 1918—KAUFFM. Agar. Mich. 620, pl. 124, 1918—REA, Brit. Basid. 103, 1922—KONR. et MAUBL. Icon. Sel. Fung. I, 36, pl. 4, 1924—BRES. Icon. Myc. I, pl. 16, 1927—VESELÝ, Ann. Myc. XXXI, 263, 1933.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 131, 1904—SHIRAI, List Jap. Fung. 8, 1905; ed. 2, 43, 1917; ed. 3, 18, 1927—IMAI, Bot. Mag. (Tokyo), XLVII, 427, 1933]

Agaricus (Amanita) spissus FR. Epicr. Myc. 9, 1838; Hymen. Eur. 23, 1874—WINT. Die Pilze, I, 845, 1884.

Solitary or gregarious, said to be edible. Pileus 4–10 cm. broad, convex, then expanded to nearly plane; surface hair-brown at first, then becoming drab, olive-brown or buckthorn-brown, darker at the center, paler on the margin, covered with whitish or grayish, fugacious floccose or powdery patches or warts of the fragments of volva, usually even or rarely short and faintly striatulate on the margin; context white, firm, taste and odour almost none; lamellae free but reaching to the stipe by a decurrent line, broad, crowded,

white, obscurely flocculose on the edge; stipe 7–15 cm. long, 7–16 mm. thick, attenuated upward, bulbous at the base, white or grayish, pruinose and powdery-scaly above the annulus, nearly fibrous below, solid or stuffed; annulus membranous, superior, white or grayish, striate above; volva powdery, remaining loose powdery-floccose, gray mass, evanescent; spores white in mass, hyaline, broadly ellipsoidal or subglobose, 8–10 × 7–9 μ, usually with a large central gutta.

Hab. on the ground in woods. Summer to autumn. Ishikari (Sapporo, Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America and Australia.

Jap. name. *Hebi-kinoko* (SHIRAI ex P. HENNINGS).

18. *Amanita spissacea* IMAI

Bot. Mag. (Tokyo), XLVII, 427, 1933.

Solitary, of doubtful edibility. Pileus 6–10 cm. broad, convex, then expanded; surface drab to fuscous, darker at the center, concentrically arranged with fuscous or hair-brown colored polygonal or pyramidal small powdery or powdery-floccose warts or patches; context white, rather thick, compact, taste and odour none; lamellae remote, white, subcrowded, ventricose, attenuated both ends; stipe 10–15 cm. long, 1–2 cm. thick, attenuated upward, obovately bulbous at the base, grayish and flocculose-scaly or powdery-scaly above the annulus, hair-brown colored powdery scaly below the annulus but it appears to be concolorously fibrous just above the bulb, solid; annulus membranous, superior, whitish and striate above, grayish-white and floccose below, margin hair-brown; volva powdery, hair-brown, forming 1–3 concentric encircling rings on the bulb of the stipe, evanescent; spores white in mass, hyaline, globose, 7–8 μ, apiculate.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Hebikinoko-modoki* (IMAI).

Amanitopsis ROZE

Bull. Soc. Bot. Fr. XXIII, 51 & 111, 1876; in KARST. Hattsv. I, xi, 1879.
Agaricus § *Vaginata* NEES v. Es. Syst. Pilze, 191, 1817.
Vaginata S. F. GRAY, Nat. Arr. Brit. Pl. I, 601, 1821.
Agaricus § *Amanita* FR. Syst. Myc. I, 12, 1821, p. p.
Amanita § *Vaginatae* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 65, 1872.
Amanitella EARLE, Bull. N. Y. Bot. Gard. V, 449, 1909.
Amanita § *Amanitopsis* Auct. plur.

Fructification with universal veil remaining as a volva and without or rarely with very fugacious partial veil. Pileus fleshy, regular. Stipe central, fleshy, distinct and separable from the pileus. Universal veil usually remaining as a membranous or powdery friable volva at the base of stipe, and patches or rarely warts on the pileus. Partial veil very fugacious, usually lacking at maturity. Lamellae free, rarely subadnate or decurrent by a tooth. Spores white in mass.

Type species: *Agaricus* (*Amanita*) *vaginatus* BULL. ex FR.

Key to the sections and species in Hokkaido.

I. Universal veil usually forming a large, deep, free and membranous volva at the base of stipe .... Sect. Volvatae.
  - A. Pileus smooth, but often besprinkled with patches of volva; spores globose.
    - 1. Volva forming an ample volvate sheath.
      - a. Pileus gray to wood-brown .... *A. vaginata* (1).
      - b. Pileus tawny or cinnamon .... *A. fulva* (2).
      - c. Pileus white or slightly tinged with pale ochraceous color at the disc .... *A. albida* (3).
    - 2. Volva breaking up into rings at the base of stipe and patches on the pileus; pileus hair-brown or cinnamon ...... *A. strangulata* (4).
  - B. Pileus scaly; spores ellipsoidal.
    - 1. Pileus whitish to brownish, covered with reddish colored fibrous small scales; spores ellipsoidal, 8–11 × 5–6 μ .... *A. agglutinata* (5).
    - 2. Pileus whitish to brownish, covered with reddish colored fibrous large scales; spores ellipsoidal oblong, 10–15 × 5–6 μ .... *A. clarisquamosa* (6).
    - 3. Pileus covered with light pinkish buff to avellaneous colored easily separable small scales; spores ellipsoidal, 9–10 × 5–6 μ .... *A. avellaneosquamosa* (7).

II. Universal veil forming a powdery, adnate, but friable volva on the bulbous base of stipe, and breaking up into squamules on the pileus .... Sect. Amanitellae.
  - A. Pileus densely covered with drab-colored powders or powdery-squamules; spores globose .... *A. farinosa* (8).

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Sect. Volvatae GILBERT

Amanita § *Amanitopsis* § *Volvatae* GILBERT, Genre Amanita, 136, 1918.
Amanitopsis sect. *Volvatae* IMAI, Bot. Mag. (Tokyo), XLVII, 428, 1933.

Universal veil usually forming a large, deep, free and membranous volva at the base of stipe.

1. *Amanitopsis vaginata* (BULL. ex FR.) ROZE

Bull. Soc. Bot. Fr. XXIII, 111, 1876; in KARST. Hattsv. I, 6, 1879, p. p.—SACC. Syll. Fung. V, 21, 1887, p. p.; Fl. Ital. Crypt., Hymen. 62, 1915, p. p.—BARLA, Champ. Alp. Marit. 18, 1888, p. p.—MASS. Brit. Fung. Fl. III, 256, 1893, p. p.—ATKINS. Mushrooms, ed. 2, 74, f. 77, 1903, p. p.—W. G. SM. Brit. Basid. 18, 1908, p. p.—MURRILL, Mycologia, I, 85, pl. 7, f. 5, 1909, p. p.—KAWAMURA, Ill. Jap. Fung. pl. 3, f. 14–17, 1912—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 6, pl. 3, 1917, p. p.—GILBERT, Genre Amanita, 136, 1918, p. p.—KAUFFM. Agar. Mich. 623, 1918, p. p.—REA, Brit. Basid. 92, 1922.

[SHIRAI, List Jap. Fung. 8, 1905; ed. 2, 45, 1917; ed. 3, 19, 1927—UMEMURA, Pl. Fujiyama. 365, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 119, 1931—IMAI, Bot. Mag. (Tokyo), XLVII, 429, 1933]

Agaricus plumbeus SCHAEFF. Fung. Bavar. IV, Ind. 37, pl. 85–86, 1774 (teste FR.).

Agaricus vaginatus BULL. Champ. Fr. pl. 98, 1791, p. p. (teste FR.).

Amanita livida PERS. Syn. Fung. 247, 1801 (teste FR.).

Agaricus (*Amanita*) *vaginatus* FR. Syst. Myc. I, 14, 1821, p. p.; Epicr. Myc. 11, 1838, p. p.; Hymen. Eur. 27, 1874, p. p.—BARLA, Champ. Nice, 9, pl. 5, f. 1–10, 1859, p. p.—CORDA, Champ. Fr. II, 12, pl. 5, 1870, p. p.—CKE. Ill. Brit. Fung. pl. 12, excl. f. dext. 1883—WINT. Die Pilze, I, 842, 1884.

Amanita vaginata QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 66, 1872, p. p.; Ench. Fung. 5, 1886, p. p.—GILL. Hymen. Fr. 50, cum icone, 1874, p. p.—ROLLAND, Atlas Champ. 18, f. 14, 1910, p. p.—RICKEN, Blätterp. 306, 1915—VESELÝ, Ann. Myc. XXXI, 274, 1933, p. p.

Amanitopsis plumbea SCHROET. Pilze Schles. I, 676, 1889, p. p.

[YASUDA, Bot. Mag. (Tokyo), XXX, (27), 1916]

Agaricus (*Amanitopsis*) *vaginatus* CKE. Handb. Austr. Fung. 4, 1892.

Vaginata vaginata MURRILL, Mycologia, III, 80, 1911, p. p.

Vaginata plumbea MURRILL, Ibid. V, 82, 1913, p. p.; North Amer. Fl. X, 65, 1914, p. p.

Amanita vaginata subsp. *plumbea* KONR. et MAUBL. Icon. Sel. Fung. I, 33, 1924.

Solitary or scattered, edible. Pileus 5–8 cm. broad, campanulate or subglobose, expanded to subplane or subumbonate, at length the margin upturned; surface gray, avellaneous or wood-brown, lighter

and deeply striate on the margin, smooth, glabrous but often besprinkled with white patches of the volva especially in young stage, slightly viscid when wet, shining, at length deprived; context white, rather thin, odour and taste none; lamellae white, free, moderately crowded, ventricose; stipe 8–15 cm. long, 1–2 cm. thick, attenuated upward, whitish, light-buff, avellaneous or wood-brown, floccosely squamulose, pruinose above, hollow or stuffed; volva membranous, white or grayish, sheathing the base of the stipe, large, ample, free about half above, lobed at the apex, persistent; spores white in mass, hyaline, globose or subglobose, rarely obovate, 12.5 μ, very rarely attaining to 15 μ, or 11–12.5 × 10 μ, with a large central gutta.

Hab. on the ground in woods. Summer to autumn. Ishikari (Mt. Teine, Sapporo, Nopporo, Mt. Taisetsu), Iburi (Lake side of Shikotsu), Kushiro (Mt. Meakan), Kitami (Oketo-forest).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe, North America and Australia.

Jap. name. *Tsurutake* (SHIRAI).

2. *Amanitopsis fulva* (SCHAEFF. ex FR.) P. HENN.

in ENGLERS Bot. Jahrb. XXXI, 738, 1902—W. G. SM. Brit. Basid. 18, 1908—REA, Brit. Basid. 93, 1922.

[MATSUM. Ind. Pl. Jap. I, 131, 1904—SHIRAI, List Jap. Fung. 8, 1905; ed. 2, 45, 1917; ed. 3, 19, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 119, 1931—IMAI, Bot. Mag. (Tokyo), XLVII, 429, 1933]

Agaricus fulvus SCHAEFF. Fung. Bavar. IV, Ind. 41, pl. 95, 1774 (teste FR.).

Agaricus trilobus BOLT. Hist. Fung. I, 38, pl. 38, f. 2, 1788 (teste FR.).

Amanita spadicea β *fulva* PERS. Syn. Fung. 248, 1801.

Agaricus (*Amanita*) *vaginatus* e. p. *fulvo* FR. Syst. Myc. I, 14, 1821.

Agaricus (*Amanita*) *vaginatus* var. *fulvus* FR. Hymen. Eur. 27, 1874—WINT. Die Pilze, I, 843, 1884.

Amanita vaginata var. *fulva* GILL. Hymen. Fr. 51, 1874.

Amanitopsis plumbea var. *fulva* SCHROET. Pilze Schles. I, 677, 1889—GILBERT, Genre Amanita, 143, 1918.

Amanita vaginata subsp. *fulva* KONR. et MAUBL. Icon. Sel. Fung. I, 33, 1924.

Solitary or scattered, edible. Pileus 4–10 cm. broad, globose or campanulate, then expanded to umbonate; surface cinnamon-buff to cinnamon, slightly darker at the center, smooth, slightly viscid when wet, glabrous, sometimes besprinkled with fugacious patches of fragments of the volva, deeply striate on the margin; context white,

thin, taste and odour none; lamellae free, white, equally attenuated toward both ends, ventricose, rather crowded, very scarcely serrulate on the edges; stipe 7–15 cm. long, 5–10 mm. thick, attenuated upward, not bulbous at the base, powdery-squamulose, scales subconcolorous or paler, white and stuffed within; volva membranous, concolorous with the stipe or white with yellowish or orangish colored small dots, ensheathing the base, large, ample, up to 4–5 cm. long, persistent; spores white in mass, hyaline, globose, 12–14 μ, with a large central gutta or granular contents.

Hab. on the ground in woods. Summer to autumn. Ishikari (Mt. Taisetsu, Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe and North America.

Jap. name. *Kabairo-tsurutake* (KAWAMURA).

3. ***Amanitopsis albida*** (FR.) IMAI

Bot. Mag. (Tokyo), XLVII, 429, 1933.

Agaricus (Amanita) vaginatus a pileo *albida* FR. Syst. Myc. I, 14, 1821.

Agaricus (Amanita) vaginatus var. *albida* FR. Epicr. Myc. 11, 1838.

Agaricus (Amanita) vaginatus b) tota *alba* FR. Hymen. Eur. 27, 1874.

Amanita vaginata var. *alba* GILL. Hymen. Fr. 51, 1874—GILBERT, Genre Amanita, 142, 1918.

Amanita vaginata subsp. *plumbea* var. *alba* KONR. et MAUBL. Icon. Sel. Fung. I, 33, 1924.

Solitary or scattered, edible. Pileus 5–10 cm. broad, campanulate, then convex to plane or slightly umbonate; surface white, besprinkled with white or grayish colored patches of volva, striate on the margin; context white, thin, taste and odour none; lamellae free, white, broader in front, moderately crowded; stipe 10–18 cm. long, 8–12 mm. thick, slightly attenuated upward or nearly equal, not bulbous at the base, concolorous; volva membranous, large, free, white or grayish, persistent; spores white in mass, hyaline, 10–12.5 μ, with a large central gutta.

Hab. on the ground in woods. Late summer to autumn. Ishikari (Sôunbetsu).

Distr. Japan (Hokkaido), Europe and North America.

Jap. name. *Yukitsurutake* (IMAI).

Amanita nivalis GREV. has been treated by many as a white form of *Amanitopsis vaginata*, but REA has described that the spores of *Amanitopsis nivalis* (GREV.) REA are oblong ellipsoidal, 11–12 × 9 μ,

with a large central gutta. The spores of our fungus are globose, 10–12.5 μ, containing a large central gutta.

4. *Amanitopsis strangulata* (FR.) ROZE

in KARST. Hattsv. I, 7, 1879—SACC. Syll. Fung. V. 23, 1887; Fl. Ital. Crypt., Hymen. 61, 1915—MASS. Brit. Fung. Fl. III, 258, 1893—W. G. SM. Brit. Basid. 19, 1908—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 8, pl. 4, 1917—KAUFFM. Agar. Mich. 624, 1918—REA, Brit. Basid. 93, 1922.

[YASUDA, Bot. Mag. (Tokyo), XXXVI, (146), 1922—SHIRAI, List Jap. Fung. ed. 3, 19, 1927]

Agaricus (*Amanita*) *strangulatus* FR. Epicr. Myc. 6, 1838; Hymen. Eur. 27, 1874—WINT. Die Pilze, I, 842, 1884.

Agaricus (*Amanita*) *Ceciliae* BERK. et BR. in BERK. Outl. Brit. Fung. 92, pl. 3, f. 5, 1860.

Amanita strangulata QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 66, 1872; Ench. Fung. 5, 1886—?BRES. Icon. Myc. I, pl. 18, 1927.

Amanita inaurata GILL. Hymen. Fr. 41, cum icone, 1874.

Amanitopsis inaurata GILBERT, Genre Amanita, 152, 1918.

Solitary or scattered, edible. Pileus 5–10 cm. broad, convex, then plane, finally upturned at the margin; surface slightly viscid when wet, dull or faintly shining when dry, hair-brown at the center, cinnamon-buff and deeply striate on the margin, often covered with flat, rather firmly adherent patches of fragments of the mealy, ashy-gray colored volva; context white, smoky near the surface, taste and odour none; lamellae free, crowded, white, edge gray colored and slightly fimbriate; stipe 8–15 cm. long, 8–15 mm. thick, attenuated upward, densely covered with ashy-gray colored powdery-fibrillose scales, base more or less incrusted with mealy patches of the friable and flocculent, mouse-gray volva, which usually forms a partial or complete ring one or two centimeter distant from the base, but rarely a sac or complete basal incrustation, hollow; spores white in mass, globose, smooth, 10–13 μ.

Hab. on the ground in woods or under trees. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), China, Europe, North America.

Jap. name. *Tengu-tsurutake* (YASUDA).

5. *Amanitopsis agglutinata* (BERK. et CURT.) SACC.

Syll. Fung. V, 23, 1887—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 11, pl. 6, 1917.

[IMAZEKI, App. Mushr. Sci. I, 40, f. 1, 1935]

Agaricus agglutinatus BERK. et CURT. in HOOKERS Journ. Bot. I, 97, 1849.

Agaricus volvatus PK. 24 Ann. Rep. N. Y. State Mus. 59, 1872.

Agaricus soleatus HOWE, Bull. Torrey Bot. Club, V, 42, 1874.

Amanitopsis volvata SACC. Syll. Fung. V, 23, 1887—KAUFFM. Agar. Mich. 622, 1918.

Vaginata agglutinata O. K. Rev. Gen. Pl. III, 539, 1898—MURRILL, Mycologia, V, 83, & 94, pl. 86, 87, f. 2, 1913; North Amer. Fl. X, 66, 1914.

Solitary or scattered, said to be poisonous. Pileus 2–8 cm. broad, hemispherical, then expanded to plane; surface dull-white or yellowish, rarely reddish-brown at the center, besprinkled with whitish or brownish-red colored powders or floccose-scales, and sometimes with large patches of the volva, dry; context soft, white or light creamy, on drying or when bruised becoming rosy, taste and odour none; lamellae free, crowded, broad, white, on drying or when bruised becoming rosy or brownish; stipe 6–14 cm. long, 5–10 mm. thick, equal or attenuated upward, enlarged at the base, white, covered with small white, brownish or reddish, flocculent scales or patches, stuffed or solid; volva large, ample, volvate, persistent, firm, white or brownish, more or less lobed; spores white in mass, ellipsoidal, smooth, 8–11 × 5–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Mt. Sapporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), China, Europe and North America.

Jap. name. *Fukuro-tsurutake* (IMAZEKI).

6. *Amanitopsis clarisquamosa* IMAI

Bot. Mag. (Tokyo), XLVII, 430, 1933.

Solitary or scattered, of doubtful edibility. Pileus 4–6 cm. broad, hemispherical or convex, then plane; surface dry, dull-white, yellowish, brownish, pale pinkish cinnamon or vinaceous-cinnamon, silky fibrous and even at the center, margin white, slightly striatulate and covered with large, fibrous scales which are colored a buff-pink or onion-skin-pink color; context whitish or pinkish, fleshy, taste and

odour none; lamellae free, white, crowded, rounded behind, broad, broader in front, ventricose; stipe 6–10 cm. long, 8–12 mm. thick, slightly attenuated upward, whitish or brownish, densely covered by powdery-floccose scales or shaggy above the volva, scales colored with buff-pink or congo-pink, stuffed or solid; volva large, membranous, up to 4.5 cm. high, 2.5 cm. thick, persistent, firm or soft, ensheathing the base of stipe, about three-fourths of the length free, lobed at the apex, brownish or whitish; spores white in mass, hyaline, ellipsoidal-oblong or subcylindrical, 10–15 × 5–6 μ, smooth, granular in contents.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Shiro-uroko-tsurutake* (IMAI).

The spores of this fungus are longer than those of the preceding species, *Am. agglutinata*, and the pileus is more scaly. But COKER's fungus of *A. agglutinata* is closely allied to this fungus. The two may be a single species but our fungus is a more scaly form.

Some European authors consider that *A. agglutinata* is identical with *Amanitopsis baccata* (FR.) SACC. If BRESADOLA's fungus is the true *A. baccata*, the figure suggests that it is a different species from ours.

7. *Amanitopsis avellaneosquamosa* IMAI

Bot. Mag. (Tokyo), XLVII, 430, 1933.

Solitary or scattered, edibility doubtful. Pileus 5–10 cm. broad, convex to plane, at length depressed at the center; surface dry, covered with light pinkish-buff to avellaneous colored, easily separable scales, densely coalescent at the center, striate on the margin; context white, thick, fleshy, taste and odour none; lamellae white, then tinged with yellowish color, free or remote, edge slightly wavy, moderately crowded, broader in front, nearly ventricose; stipe 9–17 cm. long, 6–20 mm. thick, equal or attenuated upward, scaly, subconcolorous or slightly paler, somewhat powdery floccose, hollow or stuffed; volva membranous, large, ensheathing the base of stipe, about two-thirds free above, up to 5 cm. long and 4 cm. thick, whitish or dull-pinkish, persistent; spores white in mass, hyaline, ellipsoidal, 9–10.5 × 5–6 μ.

Hab. on the ground in woods. Late summer. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Akuiro-uroko-tsurutake* (IMAI).

Sect. Amanitellae (EARLE) GILBERT

Amanitella (ut gen.) EARLE, l. c. 1909.
Amanita § *Amanitopsis* § *Amanitellae* GILBERT, Genre Amanita, 156, 1918.
Amanitopsis sect. *Pulveratae* IMAI, Bot. Mag. (Tokyo), XLVII, 430, 1933.

Universal veil forming a powdery, adnate, but friable volva on the bulbous base of stipe, and breaking up into squamules on the pileus.

8. *Amanitopsis farinosa* (SCHW.) ATKINS.

Mushrooms, 76, f. 78, 1900—COKER, Journ. Elisha Mitchell Sci. Soc. XXXIII, 14, pl. 7, 1917—GILBERT, Genre Amanita, 156, 1918.
[IMAI, Bot. Mag. (Tokyo), XLVII, 430, 1933]
Amanita farinosa SCHW. Schr. Nat. Ges. Leipzig, I, 79, 1822.
Agaricus (*Amanita*) *farinosus* FR. Epicr. Myc. 11, 1838.
Amanitella farinosa EARLE, Bull. N. Y. Bot. Gard. V, 449, 1909.
Vaginata farinosa MURRILL, Mycologia, IV, 3, pl. 56, f. 5, 1912; North Amer. Fl. X, 67, 1914.

Solitary or scattered, edibility doubtful. Pileus 3–5.5 cm. broad, subglobose, then convex, at length becoming plane and slightly depressed at the center; surface dry, densely covered with drab-colored powders, darker colored and hairy squamulose at the center, paler and striate on the margin; context white, fleshy, thin, taste and odour none; lamellae free or remote, white, rounded behind, rather distant; stipe 4–7 cm. long, 5–6 mm. thick, nearly equal, bulbous at the base, reaching to 1 cm. or more in thickness, very rarely not bulbous, white or whitish, tinged with grayish or yellowish color, somewhat pruinose, fleshy, fragile, solid or nearly hollow; volva powdery, drab-colored, evanescent; spores white in mass, hyaline, globose, 6–7.5 μ.

Hab. on the grassy ground in woods, especially under conifers. Summer to autumn. Ishikari (Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), China, North America.

Jap. name. *Hime-kona-kaburi-tsurutake* (IMAI).

Lepiota (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 60 & 70, 1872.

Agaricus § *Lepiota* PERS. Syn. Fung. 257, 1801, p. p.
Agaricus § *Lepiota* FR. Syst. Myc. I, 19, 1821.
Leucocoprinus PAT. Bull. Soc. Myc. Fr. IV, 26, 1888.
Cystoderma FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 350, 1889.
Fusispora FAYOD, Ibid. 351, 1889.
Mastocephalus BATT. ex O. K. Rev. Gen. Pl. II, 859, 1891.
Limacella EARLE, Bull. N. Y. Bot. Gard. V, 447, 1909.

Fructification with partial veil remaining later as an annulus, and usually with very fugacious universal veil when young. Pileus fleshy, regular, distinct from the fleshy stipe. Stipe central, fleshy. Universal veil very fugacious. Partial veil remaining as an annulus. Lamellae free or rarely slightly attached. Spores white in mass.

Type species: *Agaricus* (*Lepiota*) *procerus* SCOP. ex FR.

Key to the subgenera, sections and species in Hokkaido.

I. Pileus dry, squarrose, squamulose, fibrillose or pruinose; lamellae usually free.. Subgen. Eulepiota.
  A. Pileus large with large scales; annulus large, movable, persistent, distinct from the universal veil.................... Sect. Procerae.
    1. Pileus with prominent umbo; context white, unchanging in color; stipe usually with snake-like marking.......... *L. procera* (1).
    2. Pileus not distinctly umbonate; context becoming reddish on exposure; stipe without snake-like marking....... *L. rhacodes* (2).
  B. Pileus squamulose; annulus distinct, fixed, homogeneous with universal veil which clothes the stipe..................... Sect. Clypeolariae.
    1. Spores large, subcylindrical, subfusiform or turbinate.
      a. Pileus covered with small, rigid, apiculate, fuscous, deciduous warts; annulus rather large; stipe robust.. *L. acutesquamosa* (3).
      b. Pileus covered with yellow or brownish dense felt which later breaks up into floccose, torn patches or innate squamules, appendiculate at the margin................ *L. clypeolaria* (4).
      c. Pileus covered with cinnamon or reddish-brown small scales in concentric order........................ *L. cristata* (5).
    2. Spores not elongated, but ellipsoidal.
      a. Stipe abruptly bulbous; pileus covered with reddish-brown scales............................ *L. subamanitiformis* (6).
      b. Stipe not bulbous; pileus covered with reddish-brown, small scales.................................. *L. helveola* (7).

C. *Pileus pruinose, fibrillose* or pulverulent, rarely glabrous .... Sect. Pruinosae.
   1. Fructification large, 5–13 cm. in width of pileus; pileus white or sordid, subglabrous; stipe hollow .... *L. naucina* (8).
   2. Fructification small, slender; pileus salmon, then whitish, powdery. .... *L. seminuda* (9).

II. Pileus dry, granulose or verrucose, lamellae slightly attached to the stipe or nearly free .... Subgen. Cystoderma.
  A. Spores ellipsoidal.
   1. Pileus vinaceous-cinnamon, densely covered with warm-sepia colored sharply pointed warts .... *L. granulosa* (10).
   2. Pileus ochraceous, densely covered with minute warts or granules.. .... *L. amianthina* (11).
  B. Spores long, bone-shaped; pileus olivaceous-black, densely covered with small warts .... *L. ossaeiformispora* (12).

III. Pileus dry, membranous, thin, farinaceous or fibrillose-squamulose, plicate-sulcate .... Subgen. Leucocoprinus.
  A. Pileus white, yellowish or brownish, caespitose or gregarious .... *L. cepaestipes* (13).
  B. Pileus sulphur-yellow, lemon-yellow or deep yellow.
   1. Stipe rather short and bulbous at the base .... *L. lutea* (14).
   2. Stipe slender, attenuated upward but not bulbous at the base .... *L. pseudolicmophora* (15).

IV. Pileus viscid .... Subgen. Limacella.
  A. Pileus tawny to orangish .... *L. subglischra* (16).

Subgen. Eulepiota Lange emend. Imai

Lepiota § *Eulepiota* Lange Agar. Denm. II, 19, 1915, pro max. parte.

Pileus dry, squarrose, squamulose, fibrillose or pruinose. Lamellae usually free from the stipe.

Sect. Procerae Fr.

Epicr. Myc. 12, 1838 (ut *Proceri*).

Pileus large, with large scales; annulus large, movable, persistent, distinct from the universal veil.

1. *Lepiota procera* (Scop. ex Fr.) Quél.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 70, 1872; Ench. Fung. 5, 1886—Gill. Hymen. Fr. 56, cum icone, 1874—Karst. Hattsv. I, 7, 1879—Sacc. Syll. Fung. V, 27, 1887; Fl. Ital. Crypt., Hymen. 74, 1915—

SCHROET. Pilze Schles. I, 675, 1889—BARLA, Champ. Alp. Marit. 21, pl. 9, f. 1–4, 1889—MASS. Brit. Fung. Fl. III, 234, 1893—ATKINS. Mushrooms, ed. 2, 79, f. 81, 1903—MORGAN, Journ. Myc. XIII, 7, 1907—W. G. SM. Brit. Basid. 20, f. 12, 1908—ROLLAND, Atlas Champ. 19, f. 15, 1910—MURRILL, Mycologia, V, 5, pl. 92, f. 2, 1913; North Amer. Fl. X, 63, 1914—KAWAMURA, Ill. Jap. Fung. pl. 12, f. 1–4, 1914—LANGE, Agar. Denm. II, 22, 1915—RICKEN, Blätterp. 317, pl. 83, f. 1, 1915—KAUFFM. Agar. Mich. 643, pl. 132, 1918—REA, Brit. Basid. 64, 1922—BRES. Icon. Myc. I, pl. 20, 1927.

[KAWAMURA, Bot. Mag. (Tokyo), XXIII, (67), 1 fig. 1909—SHIRAI, List Jap. Fung. ed. 2, 319, 1917; ed. 3, 186, 1927—UMEMURA, Pl. Fujiyama. 368, 1923 —MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 119, 1931]

Agaricus procerus SCOP. Fl. Carn. ed. 2, II, 418, 1772 (teste FR.)—SOW. Engl. Fung. pl. 190, 1799 (teste FR.).

Agaricus (Lepiota) procerus PERS. Syn. Fung. 257, 1801 (teste FR.).

Agaricus (Lepiota) procerus FR. Syst. Myc. I, 20, 1821; Epicr. Myc. 12, 1838; Hymen. Eur. 29, 1874—BARLA, Champ. Nice, 14, pl. 8, f. 1–8, 1859—CORDA, Champ. Fr. II, 20, pl. 7, 1870—CKE. Ill. Brit. Fung. pl. 21, 1883—WINT. Die Pilze, I, 842, 1884.

Solitary or gregarious, edible. Pileus 8–20 cm. broad, ovoid to expanded, umbonate; surface radiate-fibrillose and rufescent beneath the pellicle, the pellicle thick, at first smooth and continuous, rufous to umber in color, at length torn asunder, except the umbo, into large irregular scales which become scattered and gradually fall away, margin fimbriate, silky-fibrillose; context thick, soft, white, taste and odour pleasant; lamellae free or remote, white, at times yellowish, fuscous or pinkish, close, tapering slightly behind; stipe 15–30 cm. long, 10–20 mm. thick, attenuated upward, bulbous at the base, pellicle thin, flocculose, rufous or brownish, at length drawn apart into minute scales, which appear as snake-like markings, hollow or fibrous-stuffed; annulus white above, brownish on the exterior, thick, soft, subcoriaceous, movable, apical, persistent, fibrillose at the margin; spores white in mass, ellipsoidal, apiculate, $12–18 \times 8–12\,\mu$.

Hab. on the ground in meadows, pastures and open woods. Autumn. Oshima (Ônomura), Ishikari (Nopporo), Kushiro (Kawayu).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe, North America, Africa and Australia.

Jap. name. *Karakasatake* (KAWAMURA).

2. *Lepiota rhacodes* (VITT.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 70, 1872 —GILL. Hymen. Fr. 57, cum icone, 1874—KARST. Hattsv. I, 8, 1879—SACC. Syll.

Fung. V, 29, 1887; Fl. Ital. Crypt., Hymen. 70, 1915—SCHROET. Pilze Schles. I, 675, 1889—BARLA, Champ. Alp. Marit. 22, pl. 9, f. 1–5, 1889—MORGAN, Journ. Myc. XIII, 8, 1907—W. G. SM. Brit. Basid. 20, 1908—MURRILL, North Amer. Fl. X, 64, 1914—LANGE, Agar. Denm. II, 23, 1915—RICKEN, Blätterp. 317, pl. 84, f. 1, 1915—REA, Brit. Basid. 65, 1922.

Agaricus rhacodes VITT. Fung. Mang. 158, pl. 20, 1835—FR. Epicr. Myc. 13, 1838; Hymen. Eur. 29, 1874—BERK. Outl. Brit. Fung. 92, pl. 3, f. 6, 1860—CKE. Ill. Brit. Fung. I, pl. 22, 1883—WINT. Die Pilze, I, 841, 1884.

Solitary or gregarious, edible. Pileus 7–14 cm. broad, globose then flattened or depressed; surface dry, smooth and brown when young, becoming very coarsely scaly, except at the center, from the breaking up of the pellicle; context white, reddening on exposure to the air, especially in the stipe and the disc, odour and taste pleasant; lamellae free or remote, white, lanceolate, ventricose, crowded; stipe 7–20 cm. long, 1–2 cm. thick, equal or attenuated upward, strongly bulbous at the base, white, faintly reddening, smooth, hollow; annulus white or brownish, fixed, becoming movable, edge thick, double and fimbriate; spores white in mass, ellipsoidal, $9–12 \times 6–7\ \mu$.

Hab. on the ground under trees, especially in coniferous woods. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe, North America and Australia.

Jap. name. *Karakasatake-modoki* (n. n.).

Sect. Clypeolariae FR.

Epicr. Myc. 14, 1838 (ut *Clypeolarii*).

Pileus squamulose; annulus distinct, fixed, homogeneous with universal veil which clothes the stipe.

3. *Lepiota acutesquamosa* (WEINM.) GILL.

Hymen. Fr. 60, cum icone, 1874—KARST. Hattsv. I, 9, 1879—SACC. Syll. Fung V, 34, 1887—BARLA, Champ. Alp. Marit. 24, pl. 12, f. 4–7, 1889—MASS. Brit. Fung. Fl. III, 236, 1893—W. G. SM. Brit. Basid. 21, 1908—ROLLAND, Atlas Champ. 20, f. 20, 1910—KAWAMURA, Ill. Jap. Fung. pl. 11, f. 8–10, 1914—KAUFFM. Agar. Mich. 633, 1918—REA, Brit. Basid. 67, 1922.

[SHIRAI, List Jap. Fung. ed. 2, 319, 1917; ed. 3, 185, 1927]

Amanita aspera PERS. Syn. Fung. 256, 1801.

Agaricus acutesquamosus WEINM. Syll. Pl. Nov. I, 70, 1824—FR. Epicr. Myc. 14, 1838; Hymen. Eur. 31, 1874—CKE. Ill. Brit. Fung. pl. 14, 1883—WINT. Die Pilze, I, 840, 1884.

Lepiota Friesii var. *acutesquamosa* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 72, 1872.

Lepiota aspera QUÉL. Ench. Fung. 5, 1886—MURRILL, North Amer. Fl. X, 63, 1914—SACC. Fl. Ital. Crypt., Hymen. 76, 1915.

Lepiota Friesii SCHROET. Pilze Schles. I, 674, 1889.

Solitary or gregarious, edible. Pileus 7–9 cm. broad, conical, then convex, at length umbonate; surface appressed-tomentose, pale ferruginous, provided with brown, compact, pointed, wart-like, deciduous scales on the whole surface, especially densely scattered on the center, margin at first incurved and with a small, whitish, appendiculate veil, then expanded, at length upturned and veil disappeared; context white, moderately thick, with unpleasant odour; lamellae free, white, then becoming yellowish, rather narrow, very crowded, lanceolate; stipe 8–10 cm. long, 8–12 mm. thick, equal or attenuated upward, subbulbous at the base, whitish, then pale pinkish cinnamon, darker downward, silky shining fibrillose, with spirals of concolorous scales of remnants of the universal veil, hollow; annulus white, becoming pale pinkish cinnamon, silky shining, with fragments of the universal veil, persistent; spores white in mass, hyaline, subcylindrical, rarely ellipsoidal, 5–7.5 × 3.5 μ.

Hab. on the ground or decayed wood in woods, gardens, roadsides, etc. Summer to autumn. Ishikari (Sapporo, Nopporo), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe and North America.

Jap. name. *Onitake* (KAWAMURA).

4. *Lepiota clypeolaria* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 72, 1872; Ench. Fung. 6, 1886—GILL. Hymen. Fr. 61, cum icone, 1874—KARST. Hattsv. I, 10, 1879—SACC. Syll. Fung. V, 36, 1887; Fl. Ital. Crypt., Hymen. 82, 1915—SCHROET. Pilze Schles. I, 674, 1889—MASS. Brit. Fung. Fl. III, 240, 1893—W. G. SM. Brit. Basid. 22, 1908—RICKEN, Blätterp. 323, pl. 85, f. 2, 1915—KAUFFM. Agar. Mich. 631, pl. 128, 1918—REA, Brit. Basid. 69, 1922—BRES. Icon. Myc. I, pl. 31, 1927.

Agaricus clypeolarius BULL. Champ. Fr. pl. 405, 1791 (teste FR.).

Agaricus (*Lepiota*) *clypeolarius* FR. Syst. Myc. I, 21, 1821; Epicr. Myc. 15, 1838; Hymen. Eur. 32, 1874—WINT. Die Pilze, I, 839, 1884.

Lepiota magnispora MURRILL, Mycologia, IV, 237, 1912.

Scattered or solitary, edible. Pileus 3–7 cm. broad, campanulate, then convex and flattened, obtuse or umbonate; surface floccose-scaly, white or yellowish beneath the pellicle, which is thin, at first continuous and yellowish, ochraceous or rufous, soon broken up into floccose torn patches except in the center and drawn apart into small scales, often appendiculate with the remains of the annulus at the margin; context white, thin, floccose, taste and odour pleasant; lamellae free, white or yellowish, rather crowded, soft, minutely serrulate on the edge, rather broad; stipe 5–10 cm. long, 3–8 mm. thick, equal or slightly enlarged at the base, concolorous, conspicuously floccose-squamulose below the annulus, silky at the apex, hollow; annulus floccose, concolorous, fugacious; spores white in mass, subfusiform or elongated-ellipsoidal, smooth, hyaline, 11–15 × 4–6 μ.

Hab. on the ground in woods. Summer to autumn. Iburi (Lake side of Shikotsu), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Europe, North America and Australia (?).

Jap. name. *Wata-karakasatake* (n. n.).

5. *Lepiota cristata* (BOLT. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 72, 1872; Ench. Fung. 6, 1886—GILL. Hymen. Fr. 61, 1874—KARST. Hattsv. I, 10, 1879—SACC. Syll. Fung. V, 39, 1887; Fl. Ital. Crypt., Hymen. 77, 1915—SCHROET. Pilze Schles. I, 673, 1889—BARLA, Champ. Alp. Marit. 27, pl. 14, f. 1–4, 1889—MASS. Brit. Fung. Fl. III, 242, 1893—ATKINS. Mushrooms, ed. 2, 81, f. 83, 1903—W. G. SM. Brit. Basid. 23, 1908—ROLLAND, Atlas Champ. 20, f. 19, 1910—RICKEN, Blätterp. 322, pl. 84, f. 3, 1915—KAUFFM. Agar. Mich. 641, pl. 131, 1918—REA, Brit. Basid. 71, 1922—BRES. Icon. Myc. I, pl. 34, 1927.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 150, 1904—SHIRAI, List Jap. Fung. 47, 1905; ed. 2, 319, 1917; ed. 3, 186, 1927]

Agaricus conspurcatus WILLD. Prodr. Fl. Berl. 382, 1787 (teste MORG.).

Agaricus cristatus BOLT. Hist. Fung. Halif. I, 7, 1788 (teste FR.).

Agaricus subantiquatus BATSCH, Elench. Fung. II, 59, 1789 (teste FR.).

Agaricus (*Lepiota*) *cristatus* FR. Syst. Myc. I, 22, 1821; Epicr. Myc. 15, 1838; Hymen. Eur. 32, 1874—BERK. Outl. Brit. Fung. 94, pl. 3, f. 7, 1860—CKE. Ill. Brit. Fung. pl. 29, 1883—WINT. Die Pilze, I, 839, 1884.

Agaricus miamensis MORG. Journ. Cinc. Soc. Nat. Hist. VI, 63, 1883; Journ. Myc. XII, 242, 1906.

Lepiota conspurcata MORG. Journ. Myc. XII, 243, 1906—MURRILL, North Amer. Fl. X, 56, 1914.

Lepiota castaneidisca MURRILL, Mycologia, IV, 232, 1912.

Gregarious or solitary. Pileus 1.7–4.5 cm. broad, subovoid, then convex to expanded; surface whitish, fibrous, covered with small cinnamon-colored scales in concentric order, not scaly at the center; context thin, white, with no taste and with an unpleasant odour; lamellae white, at length tinged with yellowish color, close, free; stipe 3.5–6.5 cm. long, 2.5–5 mm. thick, equal, white, silky fibrillose, tinged with light avellaneous color, not easily separable from the pileus, fragile as a cartilaginous stipe, hollow; annulus membranous, subpersistent, white, often tinged with reddish color, narrow, fixed; spores white in mass, yellowish hyaline, turbinate in shape, 5.5–7.5 × 2.5–4.5 μ.

Hab. on the rich soil or on the ground in woods. Summer to autumn. Ishikari (Sapporo, Mt. Teine, Nopporo).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe, North America and Australia.

Jap. name. *Kitsune-no-karakasa* (SHIRAI ex P. HENN.).

6. *Lepiota subamanitiformis* IMAI, sp. nov.

Solitaria. Pileo 3.5–5.5 cm. lato, conico-convexo, dein umbonato vel subplano, sicco, radiato-fibrilloso, primo cute testacea continua tecto, dein squamoso, margine subtomentoso; carne alba, tenui, odore saporeque blando; lamellis liberis, albis, subventricosis, confertis, 5 mm. latis; stipite 3.5–5.5 cm. longo, 3–5 mm. crasso, sursum attenuato, basi bulboso, usque ad 1 cm. crasso, albo, subpruinoso vel subglabro, cavo; annulo albo, margine incarnato, adhaerente, persistente, tenui, membranaceo, subinferno; sporis in cumulo albis, oblongo-ellipsoideis vel oblongis, levibus, hyalinis, 6–10.5 × 3–5 μ.

Hab. on the ground in open woods. Summer to autumn. Ishikari (Sapporo).

Distr. Endemic.

Jap. name. *Hotei-karakasatake* (n. n.).

The present fungus is closely allied to *Lepiota amanitiformis* MURRILL, from which it is distinguishable by the character of stipe

7. *Lepiota helveola* BRES.

Fung. Trid. I, 15, pl. 16, f. 2, 1882; Icon. Myc. I, pl. 32, f. 2, 1927—SACC. Syll. Fung. V, 38, 1887; Fl. Ital. Crypt., Hymen. 81, 1915—REA, Trans. Brit. Myc. Soc. IV, 307, pl. 8, 1914; Brit. Basid. 70, 1922—RICKEN, Blätterp. 326, 1915.

Gregarious or solitary, said to be poisonous in Europe. Pileus 3–4.5 cm. broad, conical, then umbonate or gibbous; surface covered with reddish brown or brown colored scales; context white, thin, tinged with reddish tint under the pellicle, odour and taste none; lamellae free, white, then slightly yellowish, close, 3 mm. wide; stipe 4–6 cm. long, 4–8 mm. thick, attenuated upward, rarely equal, whitish or pinkish and fibrillose at the upper portion, subconcolorous to the pileus and rarely scaly ringed at the base; annulus pendulous or scaly, distant, upper surface white, under surface subconcolorous; spores white in mass, smooth, ellipsoidal or subreniform, $8 \times 4\,\mu$.

Hab. on the grassy ground or on rich soil under trees. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Doku-kitsunenokarakasa* (n. n.).

The Japanese fungus has rather smaller spores than the European, but it is very close to the description and figure of *L. helveola* published by REA. The writer identifies the two as identical species.

Sect. Pruinosae MURRILL

North Amer. Fl. X, 42, 1914.

Pileus pruinose, fibrillose or pulverulent, rarely glabrous.

8. *Lepiota naucina* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 73, 1872—GILL. Hymen. Fr. 59, cum icone, 1874—KARST. Hattsv. I, 11, 1879—SACC. Syll. Fung. V, 43, 1887; Fl. Ital. Crypt., Hymen. 86, 1915—BARLA, Champ. Alp. Marit. 28, pl. 15, f. 1–4, 1889—MASS. Brit. Fung. Fl. III, 245, 1893—ATKINS. Mushrooms, ed. 2, 77, f. 79–80, 1903—W. G. SM. Brit. Basid. 23, 1908—ROLLAND, Atlas Champ. 19, f. 17, 1910—MURRILL, North Amer. Fl. X, 49, 1914—LANGE, Agar. Denm. II, 23, 1915—RICKEN, Blätterp. 319, pl. 84, f. 2, 1915—KAUFFM. Agar. Mich. 646, 1918—REA, Brit. Basid. 72, 1922—BRES. Icon. Myc. I, pl. 25, 1927.

Agaricus spherosporus KROMBH. Abbild. Schwamm. IV, 10, pl. 24, f. 19–23, 1836.

Agaricus laevis KROMBH. Ibid. 16, pl. 26, f. 16–17, 1936.

Agaricus (Lepiota) naucinus FR. Epicr. Myc. 16, 1838; Hymen. Eur. 34, 1874—CKE. Ill. Brit. Fung. pl. 15, 1883—WINT. Die Pilze, I, 838, 1884.

Agaricus (Annularia) laevis FR. Hymen. Eur. 184, 1874.

Agaricus (Lepiota) naucinoides PK. 29 Ann. Rep. N. Y. State Mus. 66, 1876.

Lepiota pudica QUÉL. Ench. Fung. 7, 1886.

Lepiota naucinoides MORG. Journ. Myc. XIII, 10, 1907.

Solitary or gregarious, edible. Pileus 5–13 cm. broad, conical or subglobose, then convex, at length slightly depressed in the center; surface white, sometimes light drab or yellowish, smooth, rarely cracked at the center, pruinose; context fleshy, thick, white, taste and odour mild; lamellae free or remote, close, white, gradually changing to pinkish, pinkish-brown when dried; stipe 8–15 cm. long, 7.5–17 mm. thick, almost equal, but enlarged at the base, white, pinkish brown when dried, silky shining, smooth, glabrous, hollow; annulus white, superior, narrow, somewhat thick, persistent, often fugacious; spores white or slightly pinkish in mass, obovate-ellipsoidal or rarely oblong, hyaline or faintly pinkish, 7–12.5 (rarely up to 18) × 4.5–7.5 μ, mostly 9–10 × 6 μ.

Hab. on the ground in pastures, fields, roadsides, etc. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe, North America and Australia.

Jap. name. *Shiro-karakasatake* (IMAI).

9. *Lepiota seminuda* (LASCH) GILL.

Hymen. Fr. 71, 1874—QUÉL. Ench. Fung. 8, 1886—SACC. Syll. Fung. V, 50, 1887; Fl. Ital. Crypt., Hymen. 88, 1915—BARLA, Champ. Alp. Marit. 31, 1888—MASS. Brit. Fung. Fl. III, 252, 1893—W. G. SM. Brit. Basid. 25, 1908—MURRILL, North Amer. Fl. X, 48, 1914—RICKEN, Blätterp. 324, 1915—REA, Brit. Basid. 78, 1922.

Agaricus seminudus LASCH, Linnaea, III, 157, 1828—FR. Epicr. Myc. 18, 1838; Hymen. Eur. 38, 1874—CKE. Ill. Brit. Fung. pl. 19, f. a, 1883—WINT. Die Pilze, I, 835, 1884.

Gregarious. Pileus 1–2.5 cm. broad, hemiglobose or conical, then umbonate; surface dry, pulverulent, salmon-buff or onion-skin-pink in young stage, then turning to whitish, darker at the center,

margin slightly incurved and connected with the stipe by a onion-skin-pink colored membranous, but fugacious veil; veil subviscid and fugacious, not forming an annulus; context white, fleshy on the center, taste and odour none; lamellae white, free, rounded and broader behind, 4 mm. broad, rather crowded; stipe 2.5–3.5 cm. long, 1.5–2 mm. thick, equal, white or pinkish above, light-russet-vinaceous to sorghum-brown below, slightly pruinose, subelastic, rigid, sub-cartilaginous, hollow; spores white in mass, oblong or ellipsoidal, 4.5–5 × 2.5 μ, hyaline, with 1–4 small guttae.

Hab. on the humus ground in woods or under trees. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe and North America.

Jap. name. *Hime-kona-karakasatake* (n. n.).

Subgen. Cystoderma (FAYOD) IMAI, nom. nov.

Agaricus § *Lepiota* § *Granulosae* FR. Hymen. Eur. 35, 1874.
Cystoderma (ut gen.) FAYOD. l. c. 1889.

Pileus granulosus vel verrucosus. Lamellae a stipite leviter adhaerentes.

10. *Lepiota granulosa* (BATSCH ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 73, 1872, p. p.—GILL. Hymen. Fr. 71, cum icone, 1874, p. p.—KARST. Hattsv. I, 14, 1879—SACC. Syll. Fung. V, 47, 1887; Fl. Ital. Crypt., Hymen. 84, 1915—SCHROET. Pilze Schles. I, 672, 1889—BARDA, Champ. Alp. Marit. 30, pl. 16, f. 5–8, 1889—MASS. Brit. Fung. Fl. III, 248, 1893—W. G. SM. Brit. Basid. 24, 1908—LANGE, Agar. Denm. II, 29, 1915—RICKEN, Blätterp. 327, pl. 81, f. 3, 1915—KAUFFM. Agar. Mich. 638, 1918—REA, Brit. Basid. 75, 1922.

Agaricus granulosus BATSCH, Elench. Fung. I, 79, 1783 (teste FR.).

Agaricus (*Lepiota*) *granulosus* PERS. Syn. Fung. 264, 1801 (teste FR.).

Agaricus (*Lepiota*) *granulosus* FR. Syst. Myc. I, 24, 1821, p. p.; Epicr. Myc. 17, 1838; Hymen. Eur. 36, 1874—CKE. Ill. Brit. Fung. pl. 18, 1883—WINT. Die Pilze, I, 837, 1884.

Gregarious or solitary, edible. Pileus 2.5–3.5 cm. broad, conical, then expanded to umbonate; surface dry, vinaceous-cinnamon, densely covered with warm-sepia colored sharply pointed warts, the warts longer and dense on the center, margin incurved at first; context thin, whitish, odour disagreeable, taste slightly bitter; lamellae

nearly free or adnexed, white then yellowish, moderately crowded; stipe 3.5–5 cm. long, 3–7 mm. thick, attenuated upward, concolorous, densely covered, below the annulus, with warts like those of the pileus and longitudinally sulcate in 2 to 4 lines, dry, brown-fibrillose above the annulus, hollow; annulus subsuperior, torn asunder into small pieces, subpendulous, subpersistent, concolorous with the warts; veil subconcolorous with warts, subpersistent; spores white in mass, ellipsoidal, smooth, 4–5.5 × 2.3–3.5 μ.

Hab. on the ground in woods or under trees. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Europe and North America.

Jap. name. *Hime-onitake* (n. n.).

11. *Lepiota amianthina* (Scop. ex Fr.) Karst.

Hattsv. I, 15, 1879—Quél. Ench. Fung. 7, 1886—Sacc. Syll. Fung. V, 48, 1887; Fl. Ital. Crypt., Hymen. 84, 1915—Barla, Champ. Alp. Marit. 30, pl. 16, f. 9–11, 1889—Schroet. Pilze Schles. I, 672, 1889—Mass. Brit. Fung. Fl. III, 249, 1893—W. G. Sm. Brit. Basid. 25, 1908—Murrill, North Amer. Fl. X, 45, 1914, p. p.—Ricken, Blätterp. 327, pl. 81, f. 4, 1915—Rea, Brit. Basid. 75, 1922—Bres. Icon. Myc. I, pl. 37, 1927.

Agaricus amianthinus Scop. Fl. Carn. ed. 2, II, 434, 1772 (teste Fr.).

Agaricus (*Lepiota*) *granulosus* Fr. Syst. Myc. I, 24, 1821, p. p.

Agaricus (*Lepiota*) *granulosus* var. *amianthinus* Fr. Epicr. Myc. 18, 1838.

Agaricus (*Lepiota*) *amianthinus* Fr. Hymen. Eur. 37, 1874—Cke. Ill. Brit. Fung. pl. 213, f. 2, 1883—Wint. Die Pilze, I, 836, 1884.

Solitary or scattered, edible. Pileus 2–5 cm. broad, convex, then expanded to gibbous or subumbonate; surface dry, ochraceous, darker at the center, pulverulent or granulose, radiately rugulose; context yellowish or yellow, rather thick, odour none; lamellae adnexed, white, then yellowish, crowded; stipe 2–6 cm. long, 3–5 mm. thick, slightly attenuated upward or nearly equal, whitish or yellowish and glabrous above the annulus, densely covered with ochraceous squamules below the annulus, hollow; annulus concolorous, squamulose on the outside, median; spores white in mass, ellipsoidal, 6–8 × 3–4 μ, smooth, hyaline; cystidia absent.

Hab. on the ground in woods. Autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido, Honshu), Europe and North America.

Jap. name. *Shiwa-karakasatake* (n. n.).

12. *Lepiota ossaeiformispora* IMAI, sp. nov.

Gregaria. Pileo 2–3 cm. lato, conico dein umbonato, sicco, olivaceo-nigro, dense squamuloso, margine pallidiore; carne alba, tenui, sapore nullo, odore foetido; lamellis subliberis, albidis dein subflavescentibus, confertis; stipite 4–7 cm. longo, 3–4 mm. crasso, subequali, albido vel olivaceo-griseo, fibrilloso vel squamuloso, cavo; annulo inferno, tomentoso, olivaceo-nigro-squamuloso; sporis in cumulo albis, ossaeiformibus, levibus, hyalinis, 10–12 × 3–4 μ.

Hab. on the ground in woods. Autumn. Ishikari (Sapporo).

Distr. Endemic.

Jap. name. *Hime-ao-onitake* (n. n.).

The present fungus is an intermediate form between *Lepiota Grangei* (EYRE) LANGE and *L. pseudofelina* LANGE. They, however, are distinct from one another.

Subgen. **Leucocoprinus** (PAT.) KONR. et MAUBL.

Icon. Sel. Fung. I, 41, 1924.
Leucocoprinus (ut gen.) PAT. l. c. 1888.

Pileus dry, membranous, thin, farinaceous or fibrillose-squamulose, plicate-sulcate on the margin.

13. *Lepiota cepaestipes* (SOW. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 73, 1872; Ench. Fung. 7, 1886—GILL. Hymen. Fr. 65, 1874—KARST. Hattsv. I, 13, 1879—SACC. Syll. Fung. V, 43, 1887; Fl. Ital. Crypt., Hymen. 69, 1915—SCHROET. Pilze Schles. I, 673, 1889—BARLA, Champ. Alp. Marit. 29, pl. 15, f. 7–11, 1889—MASS. Brit. Fung. Fl. III, 246, 1893—W. G. SM. Brit. Basid. 24, 1908—RICKEN, Blätterp. 320, 1915—KAUFFM. Agar. Mich. 640, pl. 130, 1918—REA, Brit. Basid. 74, 1922.

Agaricus cretaceus BULL. Champ. Fr. pl. 374, 1791 (teste FR.).

Agaricus cepaestipes SOW. Engl. Fung. pl. 2, 1797 (teste FR.).

Agaricus Copr.? cepaestipes PERS. Syn. Fung. 416, 1801 (teste FR.).

Agaricus (*Vaginata*) *cepaestipes* FR. Syst. Myc. I, 280, 1821.

Agaricus (*Lepiota*) *cepaestipes* FR. Epicr. Myc. 17, 1838; Hymen. Eur. 35, 1874—CKE. Ill. Brit. Fung. I, pl. 5 (p. p.) & 942, 1883—WINT. Die Pilze, I, 837, 1884.

Lepiota mammaeformis UNDERW. Bull. Torrey Bot. Club, XXIV, 82, 1897.

Lepiota cretacea MORGAN, Journ. Myc. XIII, 3, 1907—MURRILL, North Amer. Fl. X, 49, 1914.

Gregarious or caespitose, edible. Pileus 2–5 cm. broad, at first subovoid with an obtuse apex, then campanulate and expanded to umbonate; surface dry, white, yellowish or brownish, darker at the center, fibrillose or with densely floccose, fugacious scales and powders, plicate-sulcate on the margin; context thin, white, taste and odour none; lamellae free, white or whitish, narrow, crowded; stipe 5–8 cm. long, 4–6 mm. thick, attenuated upward, bulbous at the base, white, covered with fugacious, delicate flocci, hollow; annulus white, membranous, thin, fixed, inferior, persistent; spores white in mass, ellipsoidal, 7.5–9 × 4–5 μ, with a central gutta, smooth.

Hab. on humus ground under trees or in woods. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe, North America and Australia.

Jap. name. *Kinu-karakasatake* (n. n.).

14. *Lepiota lutea* [BOLT.] GODFRIN,

Bull. Soc. Myc. Fr. XIII, 33, 1897—GUÉGUEN, Bull. Soc. Myc. Fr. XXIV, 121, 1908—REA, Brit. Basid. 74, 1922—KONR. et MAUBL. Icon. Sel. Fung. pl. 15, 1930—LANGE, Fl. Agar. Dan. I, 37, pl. 14, f. G, 1935.

Agaricus luteus BOLT. Hist. Fung. Halif. I, pl. 50, 1788 (teste FR.).

Agaricus cepaestipes var. *lutea* PERS. Syn. Fung. 416, 1801—FR. Hymen. Eur. 35, 1874.

Agaricus flammula ALB. et SCHW. Consp. Lusat. 149, 1805—KICKX, Fl. Crypt. Flandr. II, 133, 1867 (teste FR.).

Agaricus flos sulphuris SCHNIZEL. apud STURM, Deuts. Fl. III, fasc. 31, 1, pl. 1, 1851 (teste FR.).

Lepiota flammula GILL. Hymen. Fr. 63, cum icone, 1874.

Lepiota cepaestipes var. *lutea* QUÉL. Ench. Fung. 7, 1886—SACC. Syll. Fung. V, 44, 1887; Fl. Ital. Crypt., Hymen. 70, 1915.

Agaricus cepaestipes Auct. p. p.

Lepiota cepaestipes Auct. p. p.

Gregarious, caespitose or solitary. Pileus 1–3 cm. or more broad, at first conical, then campanulate, finally subumbonate; surface dry, sulphur-yellow to deep yellow, covered with concolorous minute granular fugacious flocci, long plicate-sulcate on the margin; context thin, membranous, concolorous, taste none, odour none or somewhat disagreeable; lamellae free, slightly paler or subconcolorous, rather narrow, rather crowded; stipe 4–8 cm. or more long, 2–4 mm. thick, attenuated upward, bulbous at the base, concolorous, powdery,

apex smooth; annulus membranous, apical, concolorous; spores white in mass, ovoid, smooth, 8–10 × 6–7.5 μ.

Hab. on cocoanut fibre of orchid bed in greenhouse. Summer to autumn, or all seasons. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe, Ceylon?

Jap. name. *Kogane-kinukarakasatake* (n. n.).

15. *Lepiota pseudo-licmophora* Rea

Brit. Basid. 74, 1922.

Lepiota licmophora (non B. et Br., Sacc., nec Petch) Kawamura, Ill. Jap. Fung. pl. 4, f. 20–23, 1912.

[Shirai, List Jap. Fung. ed. 2, 319, 1917; ed. 3, 186, 1927]

Solitary or gregarious. Pileus 2–4 cm. broad, conical, then campanulate, finally plane or slightly depressed, membranous, very thin; surface lemon-yellow, deep yellow or sometimes yellowish, radially plicate-sulcate nearly to the center, disc smooth, crests of the ridges of sulcations clothed with concolorous or darker colored flocci, margin crenate; lamellae remote, narrow, concolorous or slightly paler, distant; stipe 4–8 cm. or more long, 2–3 mm. thick, attenuated upward, concolorous, subglabrous or slightly furfuraceous, tomentose at the base, hollow; annulus median, subconcolorous, fugacious; spores white in mass, broadly ellipsoidal, 10–12.5 × 7.5–10 μ.

Hab. on the ground among the grass under trees or in hot houses. Summer. Teshio (Yakishiri Isl.).

Distr. Japan (Hokkaido, Honshu), Europe (England).

Jap. name. *Kitsune-no-hanagasa* (Kawamura).

Subgen. **Limacella** (Earle) Imai, nom. nov.

Limacella (ut gen.) Earle, l. c. 1909.

Amanita § *Limacella* Gilbert, Genre Amanita, 158, 1918.

Pileus stipesque udo viscidus.

16. *Lepiota subglischra* Imai, sp. nov.

Solitaria. Pileo 2.5–3.5 cm. lato, subumbonato dein expanso, umbonato, udo viscossissimo, flavido vel pallide aurantiaco, margine pallido, levi, glabro, cute facile separabili; velo viscido, concolori; carne grisea, carnosa, odore saporeque nullo; lamellis liberis, flavi-

dulis, confertis, 3 mm. latis; stipite 3.5–5.5 cm. longo, 3–5 mm. crasso, subaequali vel sursum liviter attenuato, supra annulam sicco albido, infra annulam cute viscida flavidula tecto, solido vel farcto; sporis in cumulo albis, globosis vel subglobosis, 3–4.5 μ.

Hab. on the ground in woods. Late summer. Ishikari (Sapporo).

Distr. Endemic.

Jap. name. *Numeri-karakasatake* (n. n.).

The present fungus is closely allied to *Lepiota glischra* MORG., from which it is distinguished by the brighter colored umbonate pileus. However, it may be only a form of this American species, and requires further critical studies on the relation between them.

Tribe **Armillarieae** IMAI, nom. nov.

Fructificatio juvenile vol universali fugacissime veloque partiali subpersistente tecto. Pileus cum stipite carnosi confluentus et homogeneus. Lamellae molles, carnosae, cum stipite adhaerentes. Sporae in cumulo albae.

Key to the genera.

1. Partial veil usually remaining as a subpersistent or persistent membranous annulus . . . . *Armillaria.*
2. Partial veil remaining as an arachnoidal, fugacious annulus on the stipe and as a submembranous veil on the margin of pileus . . . . *Cortinellus*

Armillaria (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 60 & 74, 1872.

Agaricus § *Armillaria* FR. Syst. Myc. I, 26, 1821.

Armillaria § *Armillariella* KARST. Hattsv. I, xii, 1879, p. p.

Armillariella KARST. Finl. Basidsv. 45, 1889, p. p.

Gyrophila § *Armillaria* QUÉL. Ench. Fung. 9, 1886.

Mucidula PAT. Hymen. Eur. 95, 1887.

Oudemansiella SPEG. emend. v. HÖHN. Sitzungsb. Kaiserl. Akad. Wiss. Wien, CXVII, Abt. I, 1007, 1908; Ibid. CXIX, Abt. 1, 885, 1910, p. p.

Chamaemyces BATT. ex EARLE, Bull. N. Y. Bot. Gard. V, 446, 1909.

Polymyces BATT. ex EARLE, Ibid. 447, 1909.

Sphaerocephalus BATT. ex EARLE, Ibid. 447, 1909.

Calathelasma LOVEJ. Bot. Gaz. L, 383, 1910.

Fructification with an annulus. Pileus fleshy, regular, confluent and homogeneous with the fleshy stipe. Stipe central or rarely excentric, fleshy. Partial veil remaining as a membranous, persistent or rarely fugacious, adnate annulus when matured. Universal veil very fugacious. Lamellae attached to the stipe, fleshy, soft. Spores white in mass.

Type species: *Agaricus* (*Armillaria*) *robustus* AL. et S. ex FR.

Key to the subgenera and species in Hokkaido.

I. Stipe fleshy.
  A. Lamellae sinuato-adnexed.................... Subgen. Verarmillaria.
    1. Fructification brown, large; stipe usually enlarged toward the base. .... *A. Matsutake*(1).
    2. Fructification brown, medium in size; stipe usually attenuated at the base....................................... *A. caligata*(2).
  B. Lamellae attenuated behind, decurrent.......... Subgen. Armillariella.
    1. Growing on wood.
      a. Stipe central; pileus honey-yellow to reddish or dark brown... .... *A. mellea*(3).
      b. Stipe excentric; pileus white to avellaneous or yellowish; spores cylindrical oblong.......................... *A. corticata*(4).
      c. Stipe almost lateral; pileus variable in color; spores globose... .... *A. japonica*(5).
    2. Growing on the ground; pileus whitish, yellowish or brownish; stipe ventricose................................. *A. ventricosa*(6).
II. Stipe subcartilaginous external, rigid.................. Subgen. Mucidula.
  A. Pileus white to yellowish, viscid when wet............. *A. mucida*(7).

Subgen. **Verarmillaria** IMAI, nom. nov.

Agaricus § *Armillaria* § *Tricholomata annulata* FR. Epicr. Myc. 20, 1838.

Stipes carnosus. Lamellae sinuato-adnexae.

1. *Armillaria Matsutake* S. ITO et IMAI

Bot. Mag. (Tokyo), XXXIX, 327, 1925—ZELLER & TOGASHI, Mycologia, XXVI, 545, cum 3 fig. 1934.

[SHIRAI, List Jap. Fung. ed. 3, 23, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 118, 1931]

Agaricus (*Armillaria*) *edodes* (non BERK.) SCHROET. Gartenfl. XXXV, 135, 1886.

?*Armillaria edodes* P. HENN. in ENGLER & PR. Nat. Pflanzenfam. I, 1**, 270, 1897—KILLERM. Ibid. ed. 2, VI, 280, 1928.

Armillaria edodes P. HENN. Not. Königl. Bot. Gart. Mus. Berlin, II, 385, 1899; ENGLERS Bot. Jahrb. XXVIII, 270, 1901.

[SHIRAI, List Jap. Fung. 9, 1905; ed. 2, 51, 1917]

Cotrinellus edodes (non S. ITO et IMAI) P. HENN. Hedw. XXXIX, (156), 1900—KAWAMURA, Ill. Jap. Fung. pl. 8, f. 11–12, 1913.

[MATSUM. Ind. Pl. Jap. I, 137, 1904]

Armillaria caligata (non VIV.) HAR. et PAT. Bull. Mus. Hist. Nat. VIII, 132, 1902.

Solitary or gregarious, often forms a fairy ring, edible. Pileus 8–20 cm. or more broad, globose or hemiglobose, then convex to umbonate, finally plane; surface dry, covered with cinnamon-brown or chestnut-brown, appressed fibrous scales, usually continuous and darker at the center, margin paler, incurved and with brown or pallid woolly veil when young; context white, firm, thick, taste mild, odour pleasant and usually very strong; lamellae sinuate, white, then yellowish, broad, crowded, edge not entire; stipe 10–20 cm. or more long, 1.5–3 cm. or more thick, nearly equal or attenuated upward, usually enlarged at the base, covered with ochraceous-tawny to chestnut-brown, appressed fibrous scales below the annulus, white and mealy above the annulus, solid; annulus membranous, narrow, rarely cortinate, usually persistent as the remnant of the annulus, sometimes evanescent, superior, upper surface white, under surface subcon-concolorous to the stipe; spores white in mass, broadly ellipsoidal or nearly oblong, hyaline, smooth, $6–7.5 \times 5–6.5\ \mu$.

Hab. on the ground in coniferous woods of *Pinus, Picea,* rarely in *Abies.* Autumn. Iburi (Lake side of Shikotsu), Kitami (Notoro forest).

Distr. Japan.

Jap. name. *Matsutake.*

2. *Armillaria caligata* (VIV.) GILL.

Hymen. Fr. 79, cum icone, 1874—SACC. Syll. Fung. V, 75, 1887; Fl. Ital. Crypt., Hymen. 102, 1915—BARLA, Champ. Alp. Marit. 34, pl. 18, f. 7–13, 1889—W. G. SM. Brit. Basid. 29, 1908—ROLLAND, Atlas Champ. 21, f. 21, 1910—KAUFFM. Agar. Mich. 650, pl. 137, 1918—REA, Brit. Basid. 106, 1922—KAWAMURA, Ill. Jap. Fung. pl. 18, f. 3–5, 1925—BRES. Icon. Myc. I, pl. 45, 1927.

[SHIRAI, List Jap. Fung. ed. 3, 23, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 118, 1931]

Agaricus caligatus VIV. Funghi Ital. 40, pl. 35, 1834–38.

Agaricus caussettus var. *guttatus* BARLA, Champ. Nice, 17, pl. 10, 1859.
Agaricus (*Armillaria*) *caligatus* FR. Hymen. Eur. 41, 1874—CKE. & QUÉL. Clavis Hymen. 7, 1878.
?*Gyrophila* (*Armillaria*) *rufa* QUÉL. Ench. Fung. 9, 1886.
Tricholoma caligatum RICKEN, Blätterp. 331, 1915.

Solitary or gregarious, edible. Pileus 4–10 cm. broad, convex then expanded; surface brown or chestnut-brown, covered with appressed, denticulate, darker squamules on the disc, margin paler and floccosely squamulose with white appendiculate veil; context white, firm, rather thick, odour not strong, taste mild or slightly bitterish; lamellae sinuate or adnexed with a decurrent tooth, white, crowded; stipe 5–10 cm. long, 1–2 cm. thick, nearly equal, but attenuated at the base, white and mealy above the annulus, concolorous and floccosely squamulose below the annulus, solid; annulus membranous, superior, white on the upper surface, concolorous and squamulose on the under surface, rather narrow; spores white in mass, short ellipsoidal or spherical-ovoid, 5–7 × 4–5 μ, smooth.

Hab. on the ground in coniferous woods. Autumn. Kushiro (Mt. Meakan).

Distr. Japan (Hokkaido, Honshu), Europe and North America.

Jap. name. *Matsutake-modoki* (KAWAMURA).

Subgen. **Armillariella** KARST.

l. c. 1879.
Agaricus § *Armillaria* § *Clitocybe annulatae* FR. Epicr. Myc. 22, 1838.

Stipe fleshy. Lamellae attenuate behind, decurrent.

3. **Armillaria mellea** (VAHL ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 75, 1872—GILL. Hymen. Fr. 83, cum icone, 1874—KARST. Hattsv. I, 21, 1879—SACC. Syll. Fung. V, 80, 1887; Fl. Ital. Crypt., Hymen. 94, 1915—BARLA, Champ. Alp. Marit. 38, pl. 21, 22, 1888—SCHROET. Pilze Schles. I, 668, 1889—MASS. Brit. Fung. Fl. III, 223, 1893—ATKINS. Mushrooms, ed. 2, 83, f. 85, 1903—W. G. SM. Brit. Basid. 30, 1908—KAWAMURA, Ill. Jap. Fung. pl. 6, f. 24–25, 1913—KAUFFM. Agar. Mich. 653, pl. 138–140, 1918—REA, Brit. Basid. 108, 1922.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 131, 1904—SHIRAI, List Jap. Fung. 9, 1905; ed. 2, 51, 1917; ed. 3, 23, 1927—KAWAMURA, Bot. Mag. (Tokyo), XXIII, (166), f. 1, 1909]

Agaricus putridus SCOP. Fl. Carn. ed. 2, II, 420, 1772 (teste FR.).
Agaricus melleus VAHL, Fl. Dan. pl. 1013, 1792 (teste FR.).

Agaricus stipitis WITH. in Sow. Engl. Fung. pl. 101, 1797 (teste FR.).
Agaricus (Lepiota) polymyces PERS. Syn. Fung. 269, 1801 (teste FR.).
Agaricus (Armillaria) melleus FR. Syst. Myc. I, 30, 1821; Epicr. Myc. 22, 1838; Hymen. Eur. 44, 1874—BARLA, Champ. Nice, 18, pl. 11, f. 1–6, 1859—BERK. Outl. Brit. Fung. 96, pl. 4, f. 1, 1860—CORDA, Champ. Fr. II, 22, pl. 8, 1870—CKE. Ill. Brit. Fung. pl. 32, 1883—WINT. Die Pilze, I, 831, 1884.
Agaricus (Armillaria) melleo-rubens BERK. et CURT. Journ. Linn. Soc., Bot. X, 283, 1868.
Omphalia mellea QUÉL. Ench. Fung. 20, 1886.
Armillariella mellea KARST. Finl. Basidsv. 46, 1889.
Armillaria solidipes PK. Bull. Torrey Bot. Club, XXVII, 611, 1900.
Armillaria putrida MURRILL, North Amer. Fl. X, 39, 1914.
Clitocybe mellea RICKEN, Blätterp. 362, pl. 100, f. 1, 1915.
Lepiota mellea LANGE, Agar. Denm. II, 31, 1915.

Gregarious or caespitose, edible. Pileus 3.5–11 cm. broad, convex, then expanded to plane, occasionally slightly depressed at the center; surface pale-honey-yellow to tawny or bister, lighter on the margin, usually adorned with minute tufts of brown, blackish or light olivaceous colored hairs, that are more abundant on the center, usually dry, often slightly viscid when wet, striate on the margin; context white, whitish or yellowish, rather soft, taste and odour mild; lamellae adnate or decurrent by a tooth, moderately crowded; stipe 5–10 cm. long, 5–10 mm. thick, slightly attenuated upward, subbulbous at the base, up to 2 cm. thick, yellow, tawny or bister below, paler above, usually floccose scaly below the annulus, elastic, fibrous, nearly spongy within; annulus white or yellowish, cottony, rather thin, arachnoidal or submembranous, evanescent; spores white in mass, hyaline, ellipsoidal or nearly obovoid, $7.5 \times 5\,\mu$.

Hab. on the stumps and roots of trees of various kinds or on ground in fields, pastures or woods. Early summer to autumn. Oshima (Ônomura), Iburi (Chitose, Lake side of Shikotsu), Ishikari (Sapporo, Nopporo, Jôzankei, Mt. Kurodake), Tokachi (Lake side of Shikaribetsu), Kitami (Notoro forest, Oketo forest), Teshio (Otoineppu), Kushiro (Lake side of Kutcharo, Akan).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Siberia, Europe, North America, Australia.

Jap. name. *Naratake* (KAWAMURA), *Hariganetake* (SHIRAI ex P. HENN.), *Kuritake* (SHIRAI).

4. *Armillaria corticata* (FR.) KARST.

Hattsv. I, 22, 1879—SCHROET. Pilze Schles. I, 668, 1889—KAUFFM. Agar. Mich. 655, 1918.

Agaricus dimidiatus SCHAEFF. Fung. Bavar. IV, Ind. 57, pl. 233, 1774.

Agaricus dryinus PERS. Syn. Fung. 478, 1801.

Agaricus (*Pleurotus*) *corticatus* FR. Syst. Myc. I, 179, 1821; Epicr. Myc. 129, 1838; Hymen. Eur. 166, 1874—CKE. Ill. Brit. Fung. pl. 290, 1883—WINT. Die Pilze, I, 739, 1884.

Agaricus (*Pleurotus*) *dryinus* FR. Ibid. I, 180, 1821; Epicr. Myc. 129, 1838; Hymen. Eur. 167, 1874—CKE. Ill. Brit. Fung. pl. 226, 1883—WINT. Die Pilze, I, 739, 1884.

Pleurotus corticatus QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 111, 1872—GILL. Hymen. Fr. 339, 1874—SACC. Syll. Fung. V, 339, 1887; Fl. Ital. Crypt., Hymen. 317, 1915—MASS. Brit. Fung. Fl. III, 364, 1893—RICKEN, Blätterp. '446, pl. 112, f. 5, 1915—REA, Brit. Basid. 441, 1922—LANGE, Agar. Denm. VIII, 25, 1830.

Pleurotus dryinus QUÉL. Ibid. 111, 1872; Ench. Fung. 146, 1886—GILL. Hymen. Fr. 340, 1874—SACC. Syll. Fung. V, 340, 1887—ATKINS. Mushrooms, ed. 2, 105, f. 109–110, 1903—RICKEN, Blätterp. 445, 1915—REA, Brit. Basid. 442, 1922.

Pleurotus corticatus var. *tephrotrichus* GILL. Hymen. Fr. 340, 1874—SACC. Syll. Fung. V, 340, 1887; Fl. Ital. Crypt., Hymen. 318, 1915—BRES. Icon. Myc. VI, pl. 277, 1928.

Armillaria corticata var. *tephrotricha* KARST. Hattsv. I, 23, 1879.

Armillaria dryina KARST. Ibid. 23, 1879—KAUFFM. Agar. Mich. 654, 1918.

Armillaria dimidiata SCHROET. Pilze Schles. I, 667, 1889.

Pleurotus dimidiatus MURRILL, North Amer. Fl. X, 35, 1914—SACC. Fl. Ital. Crypt., Hymen. 318, 1915.

Pleurotus corticatus var *Albertinii* REA, Brit. Basid. 441, 1922.

Solitary or caespitose, edible. Pileus 5–20 cm. broad, convex, then expanded, obtuse or depressed, dimidiate to subcircular; surface dry, dull-white or grayish-white, sometimes tinged with yellowish color, finely flocculose at first, then the pellicle breaks up into scale-like areas or densely covered with gray or brownish-gray colored floccose scales, margin involute and appendiculate at first, then floccose; context white, thick, firm, odour slightly farinaceous, taste mild; lamellae deeply decurrent, anastomosing on the stipe, subdistant, white, then becoming yellowish, edge entire or slightly waved, rather broad; stipe excentric or nearly lateral, 2–12 cm. long, 1–3 cm. thick, subequal, radicate, stout, white or tinged with yellowish color, tomentose or floccose, firm, solid; annulus white, silky-floccose, moderately thick, soon becoming inconspicuous; spores white in mass, cylindrical-oblong, slightly curved and apiculate, 9–14 × 3.5–5 μ.

Hab. on wood in woods. Autumn. Ishikari (Jôzankei).

Distr. Japan (Hokkaido), Siberia, Europe, North America & Australia.

Jap. name. *Tsuba-hiratake* (n. n.).

5. *Armillaria japonica* (KAWAMURA) IMAI, comb. nov.

Pleurotus noctilucens (non LÉV.) INOKO, Mitteil. Med. Fac. Kaiserl. Jap. Univ. Tokyo, I, 210, 1889.

Pleurotus japonicus KAWAMURA, Journ. Coll. Sci. Imp. Univ. Tokyo, XXXV, (3), 2, pl. 1–2, 1915; Ill. Jap. Fung. pl. 18, f. 17–19, 1925.

[KAWAMURA, Bot. Mag. (Tokyo), XXIV, (278), 1910—YASUDA, Bot. Mag. (Tokyo), XXVIII, (356), 1914—SHIRAI, List Jap. Fung. ed. 2, 467, 1917; ed. 3, 285, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 116, 1931]

Caespitosely imbricate or gregarious, luminous, poisonous. Pileus 6–23 cm. broad, at first excentric, then almost lateral, at first sphaerical, then hemisphaerical or reniform, at first convex, then expanded to plane or slightly depressed; surface variable in color, when young orange-cinnamon and with ligulate squamules on the center and with fibrous squamules on the margin, then becoming somewhat paler, at length tinged with dark brown or dark purple colored spots and floccose-scaly which are distinct in the basal or central part and become smaller and less conspicuous toward the margin; context at first yellowish, then whitish, with a blackish tint at the stipe, thick, up to 2 cm. thick, taste none, odour at first none then somewhat foetid; lamellae yellow at first then whitish, broad, up to 2 cm. broad, at first long decurrent, at length sinuato-decurrent, adnato-decurrent or decurrent, often forked near the stipe and all ending abruptly in a line of the remnant of the partial veil in the upper part of stipe, or sometimes extending far down on the stipe in a line-like prominence, subdistant or somewhat crowded; stipe up to 2.5 cm. long and 3 cm. or more thick, at first excentric, then almost lateral, short, stout, firm, tough; annulus conspicuous when young, narrow thick membranous, remaining as a raised ring at the end of lamellae; spores white in mass or slightly tinged lilac, globose, 13–17 μ, smooth.

Hab. on dead beech and maple-trunks in woods. Autumn. Oshima (Ônomura), Iburi (Oshamambe), Ishikari (Mt. Soronuma).

Distr. Endemic.

Jap. name. *Tsukiyo-take* (KAWAMURA), *Kumabera* (KAWAMURA).

6. *Armillaria ventricosa* PK.

Bull. Torrey Bot. Club, XXXIV, 104, 1907—MURRILL, North Amer. Fl. X, 37, 1914—PATTERS. & CHARL. Mushrooms Comm. Fung. 12, pl. 9, 1915.

[KAWAMURA, Jap. Fung. no. 190, 1929—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 119, 1931]

Lentinus ventricosus PK. Bull. Torrey Bot. Club, XXIII, 414, 1896.

Armillaria gigantea YASUDA, Bot. Mag. (Tokyo), XXXII, (204), 1918, nom. seminud.; Ibid. XXXVI, 90, cum icone, 1922.

[SHIRAI, List Jap. Fung. ed. 3, 23, 1927]

Solitary or gregarious, edible. Pileus 8–20 cm. or more broad, convex, then expanded, obtuse; surface whitish, yellowish or brownish, sometimes brown in the center, smooth, slightly viscid when wet, glabrous or slightly silky fibrous especially on the margin, shining when dry, margin incurved and with white floccose veil when young; context white, fleshy, firm, taste mild, odour slight; lamellae long decurrent, white or yellowish, narrow, close, often forked; stipe 19–21 cm. or more long, 2–4 cm. thick, attenuated upward and downward, ventricose, subconcolorous, glabrous or slightly scaly or with drab-brown colored small patch-like scales just below the annulus, white and fibrous above the annulus, solid; annulus white or rarely faintly colored with yellow on the under surface, floccosely membranous, superior, subpersistent; spores white in mass, ellipsoidal, smooth, 9–11 × 5–6 μ.

Hab. on the ground in coniferous woods. Late summer to autumn. Ishikari (Mt. Soranuma), Kitami (Oketo forest), Kushiro (Akan).

Distr. Japan (South Saghalien, Hokkaido, Honshu), North America.

Jap. name. *Momitake* (KAWAMURA), *Sendai-samatsu* (YASUDA).

Subgen. **Mucidula** (PAT.) IMAI, nom. nov.

Agaricus § *Armillaria* § *Collybiae annulatae* FR. Epicr. Myc. 24, 1838.
Mucidula (ut gen.) PAT. l. c. 1887.
Chamaemyces BATT. in EARLE, l. c. 1909.
Oudemansiella SPEG. emend. v. HÖHN. l. c. 1910, p. p.

Stipes extus subcartilaginus.

7. *Armillaria mucida* (SCHRAD. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 75, 1872—GILL. Hymen. Fr. 77, cum icone, 1874—KARST. Hattsv. I, 24, 1879—SACC. Syll.

Fung. V, 85, 1887; Fl. Ital. Crypt., Hymen. 92, 1915—BARLA, Champ. Alp. Marit. 40, pl. 23, f. 4–8, 1889—MASS. Brit. Fung. Fl. III, 230, 1893—W. G. SM. Brit. Basid. 30, 1908—REA, Brit. Basid. 110, 1922.

[MATSUURA, Trans. Tottori Soc. Agr. Sci. II, 135, 1930; Ibid. III, 119, 1931]

Agaricus valens SCOP. Fl. Carn. ed. 2, II, 430, 1772 (teste FR.).

Agaricus mucidus SCHRAD. Spic. Fl. Germ. 116, 1794 (teste FR.).

Agaricus (Armillaria) mucidus FR. Syst. Myc. I, 28, 1821; Epicr. Myc. 24, 1838; Hymen. Eur. 46, 1874—CKE. Ill. Brit. Fung. pl. 16, 1883—WINT. Die Pilze, I, 829, 1884.

Collybia mucida QUÉL. Ench. Fung. 27, 1886—RICKEN, Blätterp. 401, pl. 106, f. 5, 1915—LANGE, Agar. Denm. II, 15, 1915.

Mucidula mucida PAT. Hymen. Eur. 95, 1887.

Lepiota mucida SCHROET. Pilze Schles. I, 671, 1889.

Chamaemyces mucida EARLE, Bull. N. Y. Bot. Gard. V, 446, 1909.

Oudemansiella mucida v. HÖHN. Sitzungsb. Kaiserl. Akad. Wiss. Wien, CXIX, Abt. I, 885, 1910—BRES. Icon. Myc. XII, pl. 600, 1929.

Gregarious or solitary, edible. Pileus 4–10 cm. broad, hemispherical, then convex, at length plane, slightly depressed at the center; surface white, light pinkish-cinnamon, light-buff or cartridge-buff at the center, viscid when wet, slightly pruinose with silky shining when dry, smooth, glabrous, with easily separable pellicle, margin incurved at first, slightly striate when matured; context white, thick, odour and taste pleasant; lamellae white or yellowish, adnate or decurrent by a tooth, very broad, distant; stipe 3–12 cm. long, 3–8 mm. thick, attenuated upward, white, silky, grayish or yellowish and striate below, rigid, subcartilaginous, solid; annulus white or yellowish, persistent but very rarely fugacious, superior; spores white in mass, globose, hyaline, 16–21 μ, mostly 18 μ; cystidia very rarely present, scattered, fusiform, $200 \times 50\ \mu$.

Hab. on decayed wood in woods. Summer to autumn. Ishikari (Jôzankei, Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu, Kyushu), Asia Minor, Europe, and North America.

Jap. name. *Numeritsubatake* (IMAI).

Cortinellus ROZE

Bull. Soc. Bot. Fr. XXIII, 51 et 113, 1876—KARST. Hattsv. I, xii, 1879—MURRILL, North Amer. Fl. X, 32, 1914.

Monomyces BATT. ex EARLE, Bull. N. Y. Bot. Gard. V, 442, 1909.

Fructification with fugacious floccose partial veil and sometimes in early stage with very fugacious universal veil. Pileus fleshy, regular, confluent and homogeneous with the fleshy stipe. Stipe central or excentric, fleshy. Universal veil very fugacious. Partial veil remaining as a floccose or arachnoidal veil or annulus, but usually disappearing when old. Lamellae attached to the stipe. Spores white in mass.

Type species: *Tricholoma vaccinum* (SCHAEFF. ex FR) QUÉL.

Key to the species in Hokkaido.

I. Growing on dead wood.
  A. Pileus brown or dark brown.......................... *C. edodes*(1).
  B. Pileus dark-red or purple.......................... *C. rutilans*(2).
  C. Pileus yellow or yellowish.......................... *C. decorus*(3).

II. Growing on the ground.
  A. Pileus white, whitish, grayish, yellowish or fuscous.
    1. Pileus whitish or grayish, adpressedly floccose or floccosely squamulose.......................... *C. scalpturatus*(4).
    2. Pileus white, rarely grayish, silky fibrillose, satiny shining.......................... *C. columbetta*(5).
    3. Pileus whitish or yellowish with numerous blackish squamules.......................... *C. squarrulosus*(6).
    4. Pileus gray, grayish-brown or fuscous, blackish at the center, innate fibrillose or fibrillose-squamulose.......................... *C. terreus*(7).
  B. Pileus some shade of brown or reddish brown.
    1. Stipe enlarged at the base but not bulbous; context becoming rufous when bruised.
      a. Stipe hollow.......................... *C. vaccinus*(8).
      b. Stipe solid.......................... *C. imbricatus*(9).
    2. Stipe bulbous at the base; context not changed in color.......................... *C. bulbiger*(10).

1. *Cortinellus edodes* (BERK.) S. ITO et IMAI (non P. HENN.)

Journ. Soc. Agr. Forest. Sapporo, XVII, 161, 1925; Bot. Mag. (Tokyo), XXXIX, 325, 1925—SAWADA, Trans. Nat. Hist. Soc. Formosa, XXVI, 264, 1936.

Agaricus (*Armillaria*) *edodes* BERK. Journ. Linn. Soc., Bot. XVI, 50, 1878.

Collybia Schiitake SCHROET. Gartenfl. XXXV, 105, 1886.

Armillaria edodes SACC. Syll. Fung. V, 79, 1887.

Lepiota Shiitake TANAKA, Bot. Mag. (Tokyo), III, (159), 1889.

Cortinellus Shiitake P. HENN. Not. Königl. Bot. Gart. Mus. Berlin, II, 385, 1899; in ENGLERS Bot. Jahrb. XXVIII, 270, 1901—SHIRAI, in MATSUM. & MIYOS. Crypt. Jap. Icon. Ill. III, pl. 46, 1900—KAWAMURA, Ill. Jap. Fung. pl. 10, f. 1–4, 1914.

[KUSANO, Bot. Mag. (Tokyo), XIV, (225), 1900—MATSUM. Ind. Pl. Jap. I, 137, 1904—SHIRAI, List Jap. Fung. 26, 1905; ed. 2, 177, 1917—UMEMURA, Bot. Mag. (Tokyo), XXVI, (152), 1912; Pl. Fujiyama. 366, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 118, 1931]

Tricholoma Shiitake RAMSB. Handb. Larger Brit. Fung. 73, 1923.

Shitaker cortinellus LLOYD, Myc. Notes, No. 71, 1266, 1924.

Cortinellus Berkeleyanus S. ITO et IMAI, Journ. Soc. Agr. Forest. Sapporo, XVII, 161, 1925; Bot. Mag. (Tokyo), XXXIX, 326, pl. 6, 1925.

[SHIRAI, List Jap. Fung. ed. 3, 104, 1927]

Gregarious, edible. Pileus 4–20 cm. or more broad, convex, then plane, sometimes slightly depressed at the center, margin incurved at first, at length upturned; surface light brown or blackish brown, darker at the center, with dark colored scales, often provided with irrgeular, more or less reticulated deep fissures, whitish or light buff colored tomentose on the margin in young stage, in maturity the remnant of veil present on the peripheral part, about 5 mm. apart from the margin; context white, often becoming brownish, thick, fleshy, taste pleasant, odour slight but becoming very strong with drying; lamellae fleshy, white, but occasionally becoming blackish brown on old or wounded portions, rather broad, edge entire or slightly wavy, moderately crowded, generally sinuate; stipe 3–10 cm. long, 8–20 mm. thick, equal or slightly attenuated downward, rarely bulbous at the base, generally central, but often becoming excentric by the position of substratum, whitish or dull yellowish, fibrous externally, in young stage covered with woolly tomentum of the remnant of the annulus, often with partial fissures transversally, solid, fibrous within; annulus woolly, conspicuous when young, then evanescent, not membranous; veil conspicuous in young stage; spores white in mass, ellipsoidal, smooth, $5\text{–}7 \times 3.5\text{–}4\,\mu$; cystidia present on the edge of lamella, broadly clavate or capitate, $9\text{–}14\,\mu$ wide, colourless, contents granular.

Hab. on the trunks of various kinds of trees. Late spring to autumn. All over the Island of Hokkaido.

Distr. Japan and China.

Jap. name. *Shiitake* (BERKELEY).

The present writer, in cooperation with Prof. ITO, detected and reported in 1925 that the scientific name of "Shiitake" should be

Cortinellus edodes deriving from *Agaricus edodes* BERK., but tunately P. HENNINGS had erroneously used its name for ıutake" owing to the misidentification by SCHROETER putting ıuch weight on the incomplete brief diagnosis of BERKELEY ut examining the type specimen, and thus it seems needful to se the new name *C. Berkeleyanus* in order to avoid confusion *C. edodes* of P. HENNINGS for the Matsutake.

Iowever, according to Article 54 of the International Rules of ıical Nomenclature, edition 3, published in 1935, it is beyond on that the name of "Shiitake" is naturally *C. edodes* (BERK.)) et IMAI (not P. HENNINGS), and *C. Shiitake* and other are yms, as well as that *Armillaria edodes* P. HENN. and *Cortinellus* s P. HENN. for "Matsutake" should be discarded.

2. *Cortinellus rutilans* (SCHAEFF. ex FR.) KARST.

Hattsv. I, 24, 1879—MURRILL, North Amer. Fl. X, 33, 1914.
ı*garicus variegatus* SCOP. Fl. Carn. ed. 2, II, 434, 1772.
ı*garicus rutilans* SCHAEFF. Fung. Bavar. IV, Ind. 51, pl. 219, 1774 (teste

ı*garicus xerampellinus* SOW. Engl. Fung. pl. 31, 1797 (teste FR.).
ı*garicus (Tricholoma) rutilans* FR. Syst. Myc. I, 41, 1821; Epicr. Myc. ɜ8; Hymen. Eur. 53, 1874—CKE. Ill. Brit. Fung. pl. 89, 1883—WINT. Die I, 825, 1884—SCHROET. Pilze Schles. I, 663, 1889.
ı*garicus (Tricholoma) variegatus* FR. Epicr. Myc. 31, 1838; Hymen. Eur. '4.
'*richoloma rutilans* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. 2 sér. V, 78, 1872—GILL. Hymen. Fr. 103, cum icone, 1874—KARST. Finl. v. 52, 1889—SACC. Syll. Fung. V, 96, 1887; Fl. Ital. Crypt., Hymen. 124, MASS. Brit. Fung. Fl. III, 188, 1893—ROLLAND, Atlas Champ. 24, f. 32, KAWAMURA, Ill. Jap. Fung. pl. 8, f. 6–7, 1913—RICKEN, Blätterp. 343, pl. 1, 1915—KAUFFM. Agar. Mich. 689, 1918—REA, Brit. Basid. 219, 1922—Icon. Myc. II, pl. 69, 1927.
MATSUM. Ind. Pl. Jap. I, 177, 1904—SHIRAI, List Jap. Fung. 100, 1905; 667, 1917; ed. 3, 398, 1927—MATSUURA & KANADA, Trans. Tottori Soc. ci. III, 118, 1931]

Gregarious, caespitose or solitary, edible. Pileus 4–23 cm. broad, anulate, then convex, finally flattened and slightly depressed at nter, sometimes umbonate; surface dry, yellow, densely covered granular, reddish-brown colored downy scales, denser and r at the center, margin at first involute; context yellow, mode- thick, taste mild, odour none; lamellae yellow, variable in

attachment to the stipe, narrow, thin, crowded, edge sulphur-yellow colored flocculose and minutely serrulate; stipe 5–14 cm. long, 5–30 mm. thick, attenuated upward or subequal, curved, often excentric, light yellow or yellow, besprinkled with concolorous minute tomentose scales or subglabrous, yellow and hollow within; spores white in mass, globose, subglobose or subellipsoidal, 5–8 × 4–7 μ, smooth.

Hab. on dead wood in woods. Autumn. Oshima (Ônomura), Ishikari (Nopporo, Sapporo), Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America and Australia.

Jap. name. *Samatsumodoki* (KAWAMURA).

3. *Cortinellus decorus* (FR.) KARST.

Hattsv. I, 25, 1879—MURRILL, North Amer. Fl. X, 33, 1914.

Agaricus flavovirens FR. Obs. Myc. I, 25. 1815 (teste FR.).

Agaricus (*Clitocybe*) *decorus* FR. Syst. Myc. I, 108, 1821.

Agaricus (*Pleurotus*) *decorus* FR. Epicr. Myc. 130, 1838; Hymen. Eur. 168, 1874—WINT. Die Pilze, I, 739, 1884.

Agaricus (*Tricholoma*) *multipunctus* PK. 25 Rep. N. Y. State Mus. 73, 1873.

Clitocybe decora GILL. Hymen. Fr. 171, 1874—KAUFFM. Agar. Mich. 724, 1918.

Tricholoma decorum QUÉL. Champ. Jura Vosg. 11 Suppl. 3, 1882—KARST. Finl. Basidsv. 52, 1889—REA, Brit. Basid. 219, 1922.

Gyrophila decora QUÉL. Ench. Fung. 11, 1886.

Tricholoma multipunctum SACC. Syll. Fung. V, 96, 1887.

Pleurotus decorus SACC. Syll. Fung. V, 342, 1887; Fl. Ital. Crypt., Hymen. 320, 1915—A. L. SM. & REA, Trans. Brit. Myc. Soc. II, 128, pl. 10, 1905—RICKEN, Blätterp. 448, 1915.

Gregarious, subcaespitose or solitary, edible. Pileus 3–6 cm. or more broad, convex, then expanded, depressed at the center, rather strongly incurved at the margin; surface moist, yellow, sometimes tinged with brownish or olivaceous colors, covered with dense, innate, fibrillose, minute, blackish or brownish scales, disc usually darker; context yellowish, rather thin, odour mild, taste mild or bitterish; lamellae adnate with a decurrent tooth or adnate, yellow, not change in color, crowded; stipe 3–6.5 cm. long, 4–7 mm. thick, equal or slightly enlarged toward the base, subconcolorous, then darker at the base, innately silky fibrillose, hollow; spores white in mass, broadly ellipsoidal, 5–6 × 4–5 μ.

Hab. on dead wood in woods. Summer to autumn. Ishikari (Sapporo, Nopporo, Mt. Kurodake), Kushiro (Lake side of Akan), Tokachi (Lake side of Shikaribetsu), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe and North America.

Jap. name. *Ki-samatsumodoki* (n. n.).

4. *Cortinellus scalpturatus* (FR.) KARST.

Hattsv. I, 27, 1879.

Agaricus (Tricholoma) scalpturatus FR. Epicr. Myc. 31, 1838; Hymen. Eur. 55, 1874—BERK. Outl. Brit. Fung. 101, 1860—CKE. Handb. Brit. Fung. I, 24, 1871—WINT. Die Pilze, I, 823, 1884.

Tricholoma scalpturatum QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 232, 1872—GILL. Hymen. Fr. 104, 1874—SACC. Syll. Fung. V, 100, 1887; Fl. Ital. Crypt., Hymen. 123, 1915—MASS. Brit. Fung. Fl. III, 191, 1893—RICKEN, Blätterp. 337, pl. 92, f. 2, 1915—REA, Brit. Basid. 222, 1922—BRES. Icon. Myc. II, pl. 74, 1927.

Gregarious, edible. Pileus 3–8 cm. broad, conical or convex, then expanded to subumbonate or nearly plane; surface dry, whitish or grayish, darker at the center, becoming light drab, adpressedly floccose or floccosely squamulose, margin fibrillosely tomentose, white; context white or whitish, taste and odour mild; lamellae emarginate, adnexed or adnate, crowded, white or grayish white, becoming yellow or spotted with yellow, ventricose; stipe 3–7 cm. long, 4–10 mm. thick, equal or unequal, either thickened or attenuated at the base, whitish, adpressedly fibrillose, usually with a ring-like floccosely white mycelial swelling at the upper part of the stipe, solid; spores white in mass, ellipsoidal, $5–7 \times 3–4\ \mu$.

Hab. on humus ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Akuge-shimeji* (n. n.).

5. *Cortinellus columbetta* (FR.) KARST.

Hattsv. I, 26, 1879.

Agaricus (Tricholoma) columbetta FR. Syst. Myc. I, 44, 1821; Epicr. Myc. 32, 1838; Hymen. Eur. 55, 1874—CKE. Ill. Brit. Fung. I, pl. 48, 1883—WINT. Die Pilze, I, 823, 1884—SCHROET. Pilze Schles. I, 663, 1889.

Tricholoma columbetta QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 78, pl. 2, f. 2, 1872—GILL. Hymen. Fr. 101, cum icone, 1874—

SACC. Syll. Fung. V, 99, 1887; Fl. Ital. Crypt., Hymen. 120, 1915—MASS. Brit. Fung. Fl. III, 190, 1893—ROLLAND, Atlas Champ. 26, f. 36, 1910—RICKEN, Blätterp. 336, pl. 89, f. 1, 1915—KAUFFM. Agar. Mich. 692, 1918—REA, Brit. Basid. 221, 1922—BRES. Icon. Myc. II, pl. 71, 1927.

Gyrophila (Tricholoma) columbetta QUÉL. Ench. Fung. 12, 1886.

Gregarious or solitary, edible. Pileus 3–10 cm. broad, convex, then expanded, subumbonate or plane, obtuse; surface pure white, rarely tinged with grayish or mouse-color, satiny-shining, dry, glabrous at first, then silky fibrillose or innately scaly, margin at first incurved and tomentose; context white, rather thin, taste and odour mild; lamellae sinuate or almost free, white, not changing in color, close, rather broad, often waved and transversely split at the edge; stipe 5–10 cm. long, 7–15 mm. thick, equal or unequal, not bulbous at the base, white, shining, fibrous externally or fibrillosely-striate, often longitudinally cracked, sometimes besprinkled with a remnant of a veil, solid; spores white in mass, subovate or broadly ellipsoidal, 6–7 × 4–5 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe and North America.

Jap. name. *Shiro-ke-shimeji* (n. n.).

6. *Cortinellus squarrulosus* (BRES.) IMAI, comb. nov.

Tricholoma squarrulosum BRES. Fung. Trid. II, 47, pl. 152, 1898; Icon. Myc. II, pl. 80, 1927—SACC. Syll. Fung. XVI, 21, 1902; Fl. Ital. Crypt., Hymen. 128, 1915—A. L. SM. & REA, Trans. Brit. Myc. Soc. II, 62, pl. 4, f. 1, 1904—W. G. SM. Brit. Basid. 36, 1908—ROLLAND, Atlas Champ. 25, f. 34, 1910—REA, Brit. Basid. 225, 1922.

Solitary or scattered, edible. Pileus 4–8 cm. broad, convex, then expanded, subumbonate; surface dry, whitish or yellowish in the ground color, besprinkled with numerous, blackish squamules, that become fuscous over the surface of pileus, squamules adhere with each other and are dense on the center, that give black color, margin floccose scaly and paler in color; context whitish or grayish, odour and taste none; lamellae almost free, white, 5–6 mm. broad, crowded; stipe 4–10 cm. long, 6–10 mm. thick, gradually enlarged toward the base, and subbulbous at the base, up to 1.5 cm. thick, concolorous, covered with blackish or fuscous, rather fibrous squamules, stuffed or slightly hollow; spores white in mass, pip-shaped or ellipsoidal, 7–9 × 4–5 μ, with a large central gutta.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).
Distr. Japan (Hokkaido), Europe.
Jap. name. *Kuroge-shimeji* (n. n.).

7. *Cortinellus terreus* (SCHAEFF. ex FR.) KARST.

Hattsv. I, 29, 1879.

Agaricus terreus SCHAEFF. Fung. Bavar. IV, Ind. 28, pl. 64, 1774 (teste FR.)—SOW. Engl. Fung. pl. 76, 1797 (teste FR.).

Agaricus argyraceus BULL. Champ. Fr. pl. 423, f. 1, pl. 513, f. 2, 1791 (teste FR.).

Agaricus (Tricholoma) terreus FR. Epicr. Myc. 34, 1838; Hymen. Eur. 57, 1874—WINT. Die Pilze, I, 821, 1884—SCHROET. Pilze Schles. I, 662, 1889.

Tricholoma terreum QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 79, 1872—GILL. Hymen. Fr. 100, cum icone, 1874—SACC. Syll. Fung. V, 104, 1887; Fl. Ital. Crypt., Hymen. 129, 1915—BARLA, Champ. Alp. Marit. 49, pl. 36, f. 1–13, 1890—MASS. Brit. Fung. Fl. III, 195, 1893—RICKEN, Blätterp. 339, pl. 92, f. 4, 1915—KAUFFM. Agar. Mich. 696, pl. 149, 1918—REA, Brit. Basid. 223, 1922—BRES. Icon. Myc. II, pl. 75, 1927—LANGE, Agar. Denm. IX, 21, 1933.

Cortinellus multiformis MURRILL, North Amer. Fl. X, 34, 1914.

Gregarious or subcaespitose, edible. Pileus 3–8 cm. broad, convex-campanulate, then expanded to umbonate; surface dry, gray, grayish-brown or fuscous, black at the center, innately fibrillose to fibrillose-squamulose, not striate; context white, tinged with gray near pellicle, rather thin, odour farinaceous, taste mild; lamellae emarginate or adnexed, crowded, rather broad, white, then grayish; stipe 4–8 cm. long, 7–15 mm. thick, equal, white, whitish or gray, floccosely fibrillose, apex white and pruinose, solid or fibrous-stuffed; spores white in mass, broadly ellipsoidal, 5–6 × 4–5 μ, smooth.

Hab. on the ground in woods. Late summer to autumn. Iburi (Lake side of Shikotsu).
Distr. Japan (Hokkaido), Europe and North America.
Jap. name. *Kuma-shimeji* (n. n.).

8. *Cortinellus vaccinus* (SCHAEFF. ex FR.) ROZE

Bull. Soc. Bot. Fr. XXIII, 113, 1876—KARST. Hattsv. I, 28, 1879—SCHROET. Pilze Schles. I, 667, 1889—MURRILL, North Amer. Fl. X, 35, 1914.

Agaricus vaccinus SCHAEFF. Fung. Bavar. IV, Ind. 13, pl. 25, 1774—PERS. Syn. Fung. 293, 1801.

Agaricus (Tricholoma) vaccinus FR. Syst. Myc. I, 42, 1821; Epicr. Myc. 33, 1838; Hymen. Eur. 56, 1874—CKE. Ill. Brit. Fung. pl. 60, 1883—WINT. Die Pilze, I, 822, 1884.

Agaricus (*Tricholoma*) *inodermeus* FR. Monogr. Hymen. Suec. I, 66, 1857; Hymen. Eur. 57, 1874.

Tricholoma vaccinum QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 79, 1872—GILL. Hymen. Fr. 97, cum icone, 1874—SACC. Syll. Fung. V, 102, 1887; Fl. Ital. Crypt., Hymen. 127, 1915—MASS. Brit. Fung. Fl. III, 191, 1893—ROLLAND, Atlas Champ. 23, f. 28, 1910—RICKEN, Blätterp. 340, pl. 90, f. 4, 1915—KAUFFM. Agar. Mich. 693, 1918—REA, Brit. Basid. 222, 1922 —BRES. Icon. Myc. II, pl. 73, 1927.

Gyrophila (*Tricholoma*) *vaccina* QUÉL. Ench. Fung. 12, 1886.

Tricholoma inodermeum SACC. Syll. Fung. V, 103, 1887.

Gregarious, edible. Pileus 3–8 cm. broad, conical to campanulate, then expanded to umbonate; surface dry, cinnamon-rufous to dark reddish brown, lighter toward the margin, densely covered with adpressed fibrillose scales, disc adpressedly fibrillose, margin at first involute and light ochraceous-salmon colored woolly tomentose; context rather thin except the disc, at first white, becoming tinged with rufous hues when bruised, taste mild or astringentish, odour faint; lamellae adnate then sinuate, somewhat distant, pallid or yellowish, then rufescent in age or when bruised; stipe 5–8 cm. long, 6–15 mm. thick, equal or subequal, somewhat irregular, thickened and fusiformly attenuated at the base, fibrillose, white or whitish and mealy above, reddish-brown below, rufescent when bruised, stuffed at first, then hollow; spores white in mass, subglobose or broadly ellipsoidal, 6–8 × 4–6 μ, usually with a central gutta.

Hab. on the ground in woods, especially of conifers. Autumn. Oshima (Ônomura), Ishikari (Jôzankei, Nopporo), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), Europe and North America.

Jap. name. *Kuda-akage-shimeji* (n. n.).

9. **Cortinellus imbricatus** (FR.) KARST.

Hattsv. I, 27, 1879.

Agaricus (*Tricholoma*) *imbricatus* FR. Syst. Myc. I, 42, 1821; Epicr. Myc. 33, 1838; Hymen. Eur. 56, 1874—BERK. Outl. Brit. Fung. 99, pl. 4, f. 3, 1860—CKE. Ill. Brit. Fung. pl. 199, 1883—WINT. Die Pilze, I, 822, 1884—SCHROET. Pilze Schles. I, 662, 1889.

Tricholoma imbricatum QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 79, 1872—GILL. Hymen. Fr. 99, cum icone, 1874—SACC. Syll. Fung. V, 101, 1887; Fl. Ital. Crypt., Hymen. 127, 1915—RICKEN, Blätterp. 341, pl. 90, f. 1, 1915—KAUFFM. Agar. Mich. 693, 1918—REA, Brit. Basid. 222, 1922 —BRES. Icon. Myc. II, pl. 72, 1927.

Gregarious or solitary, edible. Pileus 5–10 cm. broad, broadly convex, then expanded, obtuse or subumbonate; surface dry, brownish-red or pale reddish-umber, innately fibrilloso-squamulose, lacerately scaly on the center, margin thin, at first incurved and pubescent, then naked; context white, often becoming light red when bruised, firm, compact, thick, taste and odour mild; lamellae sinuate or adnexed, crowded, white or yellowish, then changing to reddish in age or rufescent-spotted; stipe 4–8 cm. long, 1–2 cm. thick, equal or subequal, sometimes ventricose or attenuated at the base, concolorous, white-furfuraceous at the apex, subfibrillose, solid at first, finally stuffed; spores white in mass, broadly ellipsoidal, 5–7 × 4–5 μ.

Hab. on the ground in coniferous and mixed woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe and North America.

Jap. name. *Akage-shimeji* (n. n.).

10. **Cortinellus bulbiger** (ALB. et SCHW. ex FR.) GILL.

Hymen. Fr. pl. (non in script.)—PAT. Essai Tax. 161, 1900—KONR. et MAUBL. Icon. Sel. Fung. II, pl. 108, 1924.

Agaricus bulbiger ALB. et SCHW. Consp. Lusat. 151, 1805 (teste FR.).

Agaricus (Armillaria) bulbiger FR. Syst. Myc. I, 27, 1821; Epicr. Myc. 20, 1838; Hymen. Eur. 40, 1874—CKE. Ill. Brit. Fung. pl. 20, 1883—WINT. Die Pilze, I, 833, 1884.

Armillaria bulbigera QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 231, 1872—GILL. Hymen. Fr. 80, 1874—SACC. Syll. Fung. V, 73, 1887; Fl. Ital. Crypt., Hymen. 102, 1915—SCHROET. Pilze Schles. I, 670, 1889—MASS. Brit. Fung. Fl. III, 225, 1893—REA, Brit. Basid. 105, 1922.

Gyrophila (Armillaria) bulbigera QUÉL. Ench. Fung. 9, 1886.

Tricholoma bulbigerum RICKEN, Blätterp. 331, pl. 87, f. 1, 1915.

Solitary or scattered, edible. Pileus 5–10 cm. broad, convex then expanded to nearly plane; surface dry, ochraceous-tawny, darker at the center, paler on the margin, nearly smooth, provided with whitish squamuloso-fibrillose fragments of veil; context white, fleshy, thick, taste and odour none; lamellae white, becoming brownish when dry, adnexed or sinuate-adnexed, moderately crowded, broad; stipe 4–8 cm. long, 8–15 mm. thick, equal but bulbous at the base, whitish or grayish, floccose above the annulus, fibrous below the annulus, solid; annulus white or grayish, somewhat inconspicuous, fibrous, fugacious, not membranous; spores whitish or light ochraceous in

mass, ellipsoidal or subobovate, 6.5–8.5 × 5 μ, with a large central gutta.

Hab. *on the ground in woods, especially under conifers.* Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Hida-hoteitake* (IMAI).

Tribe **Trichotomateae** IMAI, nom. nov.

Tricholomées KONR. et MAUBL. Icon. Sel. Fung. 29 & 297, 1924–35, p. p.

Fructificatio juvenile velis universali partialique fugacissimis raro tecta vel nulla. Pileus cum stipite carnosi confluentus et homogeneus. Lamellae molles, carnosae, cum stipite adhaerentes. Sporae in cumulo albae vel raro leviter incarnatae.

Key to the genera.

I. Lamellae not becoming white powdery when dried.
  1. Lamellae sinuate, emarginate or adnexed................ *Tricholoma.*
  2. Lamellae decurrent, adnato-decurrent by a tooth............ *Clitocybe.*

II. Lamellae becoming white powdery when dried, adnexed or decurrent....... .... *Laccaria.*

Tricholoma (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D' Emul. Montb. 2 sér. V, 61 & 76, 1872.

Agaricus § *Tricholoma* FR. Syst. Myc. I, 36, 1821.
Gyrophila § *Tricholoma* QUÉL. Ench. Fung. 10, 1886.
Melaleuca PAT. Hymen. Eur. 96, 1887.
Melanoleuca PAT. Tax. Hymen. 159, 1900.
Glutinaster EARLE, Bull. N. Y. Bot. Gard. V, 433, 1909.
Micromphale MURRILL, North Amer. Fl. IX, 307, 1916, p. p.

Fructification without volva and annulus. Pileus fleshy, regular, confluent and homogeneous with the fleshy stipe. Stipe central, fleshy. Universal veil adnate, very fugacious. Lamellae fleshy, sinuate, emarginate or adnexed, rarely varying to adnate, rarely separable from the context of pileus. Spores white in mass or rarely sordid white.

Type species: *Agaricus (Tricholoma) equestris* L. ex FR.

Key to the subgenera, sections and species in Hokkaido.

I. Stipe usually central, fibrous-fleshy; pileus fibrillose, dry, or more or less viscid, not hygrophanous........................ Subgen. Eutricholoma.

A. Pileus more or less viscid, innate fibrillose or squamulose.. Sect. Limacina.

1. Lamellae not changing color.

a. Pileus yellowish, sulphur-olive or olivaceous, smooth or subsquamose; lamellae bright yellow............ *T. equestre*(1).

b. Pileus light yellow, streaked with innate fuscous fibrils; lamellae whitish, slightly tinged with yellow.. *T. sejunctum*(2).

2. Lamellae changing color, generally with reddish spots.

a. Pileus brown or chestnut, streaked with innate fibrils; growing in coniferous woods.................... *T. albobrunneum*(3).

b. Pileus bay-brown or rufescent, granulate or guttato-spotted; growing in coniferous woods............ *T. pessundatum*(4).

3. Lamellae changing color, from purplish to brownish.. *T. porphyrophillum*(5).

B. Pileus punctato-granulate or broken up into glabrous squamules when dry.. Sect. Rigida.

1. Lamellae white or pallid, not spotted; pileus blackish, rigid.. *T. cartilagineum*(6).

C. Pileus fleshy, soft, fragile, spotted or rivulose.......... Sect. Guttata.

1. Vernal; pileus whitish, ochraceous or yellowish; stipe glabrous, usually enlarged at the base; lamellae whitish.. *T. gambosum*(7).

2. Occurs in summer to autumn; pileus whitish; stipe fuscous-verrucose.................................. *T. verrucipes*(8).

D. Pileus tenaceous, glabrous, even; lamellae sinuate, adnexed or subdecurrent; fructification often caespitose............ Sect. Aggregata.

1. Pileus whitish, grayish or blackish, white pruinose.. *T. conglobatum*(9).

2. Pileus blackish, usually tigrinous, white pruinose.. *T. humosum*(10).

II. Stipe usually central, more or less subcartilaginous; pileus hygrophanous; spores white in mass.............................. Subgen. Melaleuca.

A. Fructification usually large; pileus sayal-brown; stipe whitish, striate. .... *T. grammopodium*(11).

B. Fructification usually medium size; pileus fuliginous or avellaneous; stipe white.................................. *T. melaleucum*(12).

III. Stipe usually central; pileus usually dry; spores slightly tinged with rose hue in mass or whitish........................ Subgen. Rhodopaxillus.

A. Fructification usually large; pileus somewhat violaceous, soon fading to tan-color or whitish; lamellae violaceous soon fading; stipe usually subbulbous at the base........................ *T. personatum*(13).

B. Fructification usually of medium size, violaceous, then fading; lamellae blue or pale-lilac, then fading...................... *T. nudum*(14).

IV. Stipe usually excentric or subcentral, truncigenous; pileus dry or moist, glabrous; spores white in mass.................... Subgen. Micromphale.
1. Pileus glabrous, whitish, grayish, yellowish or brownish, often marbled with rounded livid spots.......................... *T. ulmarium*(15).

Subgen. **Eutricholoma** LANGE emend. IMAI

Tricholoma § *Eutricholoma* LANGE *Agar.* Denm. IX, 8, 1933, p. p.

Pileus fibrillosus, siccus vel viscidus, non hygrophanus. Stipes fibrilloso-carnosus. Sporae in cumulo albae.

Sect. **Limacina** (FR.) IMAI, nom. nov.

Agaricus § *Tricholoma* § *Tricholomata limacina* FR. Syst. Myc. I, 36, 1821.

Pileus viscidus, innato-fibrillosus vel squamulosus.

1. ***Tricholoma equestre*** (L. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 76, 1872—GILL. Hymen. Fr. 94, cum icone, 1874—KARST. Hattsv. I, 30, 1879—SACC. Syll. Fung. V, 87, 1887; Fl. Ital. Crypt., Hymen. 113, 1915—BARLA, Champ. Alp. Marit. 41, pl. 24, f. 1–12, 1890—MASS. Brit. Fung. Fl. III, 177, 1893—W. G. SM. Brit. Basid. 32, 1908—MURRILL, Mycologia, I, 2, pl. 1, f. 3, 1909—ROLLAND, Atlas Champ. 22, f. 24, 1910—KAWAMURA, Ill. Jap. Fung. pl. 7, f. 26–28, 1913—RICKEN, Blätterp. 335, pl. 90, f. 3, 1915—KAUFFM. Agar. Mich. 682, 1918—REA, Brit. Basid. 215, 1922—BRES. Icon. Myc. II, pl. 53, 1927—LANGE, Agar. Denm. IX, 16, 1933.

[SHIRAI, List Jap. Fung. ed. 2, 665, 1917; ed. 3, 397, 1927—UMEMURA, Pl. Fujiyama. 371, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 117, 1931]

Agaricus equestris L. Sp. Pl. 1173, 1753 (teste FR.).

Agaricus aureus SCHAEFF. Fung. Bavar. IV, Ind. 19, pl. 41, 1774 (teste FR.).

Agaricus (*Gymnopus*) *flavovirens* PERS. Syn. Fung. 319, 1801 (teste FR.).

Agaricus (*Tricholoma*) *equestris* FR. Elench. Fung. I, 6, 1828; Epicr. Myc. 26, 1838; Hymen. Eur. 48, 1874—BERK. Outl. Brit. Fung. 97, pl. 4, f. 2, 1860—CKE. Ill. Brit. Fung. pl. 72, 1883—WINT. Die Pilze, I, 829, 1884—SCHROET. Pilze Schles. I, 666, 1889.

Gyrophila (*Tricholoma*) *equestris* QUÉL. Ench. Fung. 10, 1886.

Melanoleuca equestris MURRILL, North Amer. Fl. X, 24, 1914.

Gregarious or subcaespitose, edible. Pileus 5–10 cm. broad, convex, then expanded to subumbonate; surface viscid when wet, pale yellow or lemon-yellow, besprinkled with reddish or fuscous squamules

especially on the center, margin even, naked; context whitish, tinged with yellow under the pellicle, odour almost none, taste at first farinaceous, then unpleasant; lamellae sinuate or nearly free, crowded, sulphur-yellow, rather broad, ventricose; stipe 5–10 cm. long, 1–2 cm. thick, equal or subbulbous at the base, white, pale-yellow or sulphur-yellow, squamulose or nearly glabrous, solid, then stuffed or nearly hollow; spores white in mass, $6–8 \times 4–5\,\mu$, ellipsoidal, smooth.

Hab. on the ground in coniferous or mixed woods. Autumn. Oshima (Ônomura).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Kishimeji* (KAWAMURA).

2. *Tricholoma sejunctum* (SOW. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 76, 1872—GILL. Hymen. Fr. 96, cum icone, 1874—KARST. Hattsv. I, 31, 1879—SACC. Syll. Fung. V, 88, 1887; Fl. Ital. Crypt., Hymen. 113, 1915—MASS. Brit. Fung. Fl. III, 178, 1893—ATKINS. Mushrooms, ed. 2, 88, f. 89, 1903—W. G. SM. Brit. Basid. 32, 1908—ROLLAND, Atlas Champ. 22, f. 26, 1910—RICKEN, Blätterp. 335, pl. 89, f. 2, 1915—KAUFFM. Agar. Mich. 683, 1918—REA, Brit. Basid. 215, 1922—LANGE, Agar. Denm. IX, 16, 1933.

Agaricus sejunctus SOW. Engl. Fung. pl. 126, 1799 (teste FR.).

Agaricus leucozanthus PERS. Syn. Fung. 319, 1801 (teste FR.).

Agaricus (*Tricholoma*) *sejunctus* FR. Syst. Myc. I, 47, 1821; Epicr. Myc. 26, 1838; Hymen. Eur. 48, 1874—CKE. Ill. Brit. Fung. pl. 53, 1883—WINT. Die Pilze, I, 828, 1884—SCHROET. Pilze Schles. I, 666, 1889.

Gyrophila (*Tricholoma*) *sejcunta* QUÉL. Ench. Fung. 10, 1886.

Melanoleuca sejuncta MURRILL, North Amer. Fl. X, 25, 1914.

Gregarious or subcaespitose, edible. Pileus 4–10 cm. broad, conical or convex, then expanded to umbonate; surface subviscid when wet, streaked with innate brown or blackish fibrils, varying from whitish or yellowish to olivaceous or smoky-brownish; context white or faintly yellowish, fragile, odour and taste subfarinaceous; lamellae sinuate or emarginate, white with yellow tint, usually broad, subdistant, fragile; stipe 5–10 cm. long, 1–2 cm. thick, equal or variously thickened and flexuous, white or yellowish, subglabrous, solid; spores white in mass, globose or subglobose, smooth, 6×4 or $5\,\mu$.

Hab. on the ground in woods. Late summer to autumn. Ishikari (Nopporo, Mt. Kurodake), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Europe and North America.
Jap. name. *Ai-shimeji* (IMAI).

3. *Tricholoma albobrunneum* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 77, 1872—GILL. Hymen. Fr. 93, cum icone, 1874—KARST. Hattsv. I, 34, 1879—SACC. Syll. Fung. V, 93, 1887—BARLA, Champ. Alp. Marit. 44, pl. 27, f. 7–11, 1890—MASS. Brit. Fung. Fl. III, 184, 1893—W. G. SM. Brit. Basid. 34, 1908—ROLLAND, Atlas Champ. 23, f. 29, 1910—RICKEN, Blätterp. 333, pl. 88, f. 4, 1915—REA, Brit. Basid. 218, 1922.

Agaricus striatus SCHAEFF. Fung. Bavar. IV, Ind. 18, pl. 38, 1774 (teste FR.).

Agaricus (Cortinaria) albobrunneus PERS. Syn. Fung. 293, 1801 (teste FR.).

Agaricus (Tricholoma) albobrunneus FR. Syst. Myc. I, 37, 1821; Epicr. Myc. 29, 1838; Hymen. Eur. 51, 1874—CKE. Ill. Brit. Fung. pl. 197, 1883—WINT. Die Pilze, I, 826, 1884.

Gyrophila (Tricholoma) albobrunnea QUÉL. Ench. Fung. 11, 1886.

Agaricus (Tricholoma) striatus SCHROET. Pilze Schles. I, 665, 1889.

Tricholoma striatum SACC. Fl. Ital. Crypt., Hymen. 118, 1915—LANGE, Agar. Denm. IX, 15, 1933.

Gregarious or solitary, edible. Pileus 3.5–7 cm. broad, conical to convex, then subumbonate; surface viscid when wet, rufous-brown or nearly chestnut color, margin paler, streaked with innate fibrils; context white, firm, tinged with brown under pellicle; taste mild, odour faint; lamellae sinuate or emarginate, rather crowded, white, becoming pale or rufescent with age, broad, firm; stipe 4–8 cm. long, 1–2 cm. thick, equal, dry, apex white-mealy, rufescent-striate below; solid; spores white in mass, subglobose or ovate-ellipsoidal, 4–6 × 3–4 μ, smooth, hyaline.

Hab. on the ground in woods, especially under *Pinus*. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Europe.

Jap. name. *Matsu-shimeji* (n. n.).

4. *Tricholoma pessundatum* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 77, 1872—GILL. Hymen. Fr. 92, cum icone, 1874—KARST. Hattsv. I, 34, 1879—SACC. Syll. Fung. V, 94, 1887; Fl. Ital. Crypt., Hymen. 117, 1915—BARLA, Champ. Alp. Marit. 45, pl. 28, f. 9–11, 1890—MASS. Brit. Fung. Fl. III, 184, 1893—W. G. SM. Brit. Basid. 34, 1908—ROLLAND, Atlas Champ. 26, f. 39, 1910—RICKEN, Blätterp. 333, pl. 88, f. 1, 1915—REA, Brit. Basid. 218, 1922—BRES. Icon. Myc. II, pl. 65, 1927.

Agaricus (Tricholoma) pessundatus FR. Syst. Myc. I, 38, 1821; Epicr. Myc. 29, 1838; Hymen. Eur. 52, 1874—WINT. Die Pilze, I, 826, 1884—SCHROET. Pilze Schles. I, 664, 1889.

Gregarious, edible. Pileus 6–12 cm. broad, convex, then expanded, subumbonate, finally plane or slightly depressed at the center; surface with separable viscid pellicle, testaceous to vinaceous-russet at the center, margin paler to light vinaceous-cinnamon or buff-pink, granulate with minute black dots especially on the center; context white, rather soft, taste bitterish, odour subfarinaceous; lamellae deeply emarginate, somewhat free, white, then spotted with orange-cinnamon, mikado-brown or snuff-brown color, crowded; stipe 5–8 cm. long, 1–2 cm. thick, enlarged or bulbous at the base, white, covered with small brownish granules, solid; spores white in mass, subglobose, about 5 ×4 μ.

Hab. on the ground in woods, especially under *Abies*. Autumn. Ishikari (Jôzankei).

Distr. Japan (Hokkaido, Honshu) and Europe.

Jap. name. *Ô-kaki-shimeji* (n. n.).

5. *Tricholoma porphyrophyllum* IMAI, sp. nov.

Gregarium vel subcaespitosum. Pileo 5.5–15 cm. lato, convexo, dein expanso, plano, viscidulo vel uvido, fulvo vel subcastaneo, levi, margine pallidiori, undulato; carne tenui, fragili; odore saporeque blando; lamellis sinuatis, subatropurpureis, dein discolorantibus, demum fulvidulis, subangustis, confertissimis; stipite 4.5–15 cm. longo, 6–25 mm. crasso, aequali vel deorsum subbulboso, albido, flavido vel fulvulo, fibrilloso, e farcto cavo, radice loriformi praedito; sporis in cumulo albis, subquadrangularibus, plus minusve cruciformibus vel subtriangularibus, 6–7.5 × 4.5–6 μ.

Hab. on the ground in woods or under trees. Summer to autumn. Ishikari (Nopporo, Sapporo).

Distr. Endemic.

Jap. name. *Ura-murasaki-shimeji* (n. n.).

The present fungus is closely allied to *Tricholoma goniospermum* BRES. from which it is distinguishable in the darker colored, thin and fragile pileus, and in the rather longer hollow stipe. It is also somewhat related to *T. sordidum* FR., of BRESADOLA's sense, in which *Agaricus calathus* FR. and *Agaricus cyanopheus* GONN. et RAB. are included, but it is easily distinguished by the shape of spores, because those of the latter species are described subcylindrical and smooth.

Sect. Rigida (FR.) IMAI, nom. nov.

Agaricus § *Tricholoma* § *Tricholomata rigida* FR. Epicr. Myc. 35, 1838.

Pilei pellicula rigida punctato-granulata vel siccitate in squamulas glabras diffracta, non viscosa.

6. *Tricholoma cartilagineum* (FR.) QUÉL.

Champ. Jura Vosg. II, in Mém. Soc. D'Emul. Montb. 2 sér. V, 339, 1873—GILL. Hymen. Fr. 109, cum icone, 1874—KARST. Hattsv. I, 37, 1879—SACC. Syll. Fung. V, 107, 1887—BARLA, Champ. Alp. Marit. 53, pl. 39, f. 6–10, 1890—REA, Brit. Basid. 226, 1922.

Agaricus (Tricholoma) cartilagineus FR. Epicr. Myc. 36, 1838; Hymen. Eur. 60, 1874—BERK. Outl. Brit. Fung. 101, 1860.

Clitocybe cartilaginea var. *Friesii* SACC. Fl. Ital. Crypt., Hymen. 182, 1915.

Caespitose, edible. Pileus 3.5–10 cm. broad, convex, then expanded, gibbous, undulated; surface fuscous-black or clove-brown (blackish), often mixed in here and there with avellaneous or wood-brown spots, blackly dotted from the pellicle breaking up into minute black granules, margin almost parmanently incurved, pubescent at first; context thin, whitish at first, at length brownish, fragile, taste and odour pleasant; lamellae sinuate, broadly adnexed or almost free, white then gray or yellowish, finally darkening from the edge, crowded, 6–10 mm. broad, edge waved or minutely toothed; stipe 3–15 cm. long, 5–12 mm. thick, slightly attenuated upward or nearly equal with a slightly enlarged or somewhat rooting base, grayish white, then subconcolorous, darker at the base, subcartilaginous, furfuraceous at the apex, flocculose or coarsely villous at the base, solid or stuffed; spores white in mass, broadly ellipsoidal, smooth, 5–6 × 3–4 μ.

Hab. on the ground or around rotting wood or stumps in woods. Autumn. Ishikari (Nopporo, Jôzankei).

Distr. Japan (Hokkaido, Honshu), Europe.

Jap. name. *Kuro-shimeji* (n. n.).

Sect. Guttata (FR.) IMAI, nom. nov.

Agaricus § *Tricholoma* § *Tricholomata guttata* FR. Epicr. Myc. 43, 1838.

Pileus carnosus, fragilis, guttato-maculosus rivulosusve.

7. *Tricholoma gambosum* (FR.) GILL.

Hymen. Fr. 116, *cum icone*, 1874—KARST. Hattsv. I, 45, 1879—SACC. Syll. Fung. V, 120, 1887; Fl. Ital. Crypt., Hymen. 141, 1915—BARLA, Champ. Alp. Marit. 54, pl. 41, f. 1–7, 1890—MASS. Brit. Fung. Fl. III, 208, 1893—W. G. SM. Brit. Basid. 40, 1908—REA, Brit. Basid. 232, 1922—LANGE, Agar. Denm. IX, 28, 1933.

[KAWAMURA, Jap. Fung. no. 237, 1929]

Agaricus Georgii L. Sp. Pl. 1173, 1753.

Agaricus mouceron BULL. Champ. Fr. pl. 142, 1791.

Agaricus graveolens Sow. Engl. Fung. pl. 281, 1803 (teste FR.).

Agaricus (*Tricholoma*) *gambosus* FR. Syst. Myc. I, 50, 1821; Epicr. Myc. 43, 1838; Hymen. Eur. 66, 1874—BERK. Outl. Brit. Fung. 104, pl. 4, f. 5, 1860—CKE. Handb. Brit. Fung. I, 31, 1871; Ill. Brit. Fung. pl. 63, 1883—WINT. Die Pilze, I, 814, 1884—SCHROET. Pilze Schles. I, 659, 1889.

Agaricus (*Tricholoma*) *Georgii* FR. Epicr. Myc. 43, 1838; Hymen. Eur. 67, 1874—WINT. Die Pilze, I, 814, 1884.

Agaricus (*Tricholoma*) *albellus* FR. Epicr. Myc. 43, 1838; Hymen. Eur. 67, 1874—WINT. Die Pilze, I, 814, 1884.

Tricholoma Georgii QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 81, 1872—SACC. Syll. Fung. V, 120, 1887—BARLA, Champ. Alp. Marit. 55, pl. 41, f. 8–11, 1890—ROLLAND, Atlas Champ. 25, f. 35, 1910—RICKEN, Blätterp. 350, pl. 95, f. 2, 1915—REA, Brit. Basid. 232, 1922.

Tricholoma albellum QUÉL. Ibid. 81, 1872—KARST. Hattsv. I, 45, 1879—SACC. Syll. Fung. V, 121, 1887; Fl. Ital. Crypt., Hymen. 142, 1915—BARLA, Champ. Alp. Marit. 55, pl. 41, f. 12–17, 1890—REA, Brit. Basid. 233, 1922.

Gyrophila (*Tricholoma*) *Georgii* QUÉL. Ench. Fung. 15, 1886.

Tricholoma Mouceron SACC. Fl. Ital. Crypt., Hymen. 140, 1915.

Gregarious or caespitose, edible. Pileus 4–12 cm. broad, hemispaerical, then convex to gibbous or nearly plane; surface white, whitish-gray, yellowish, yellowish-gray or ochraceous, undulate, smooth, subglabrous or subfloccose, margin incurved and subtomentose at first or almost naked; context white, thick, firm, odour farinaceous, taste mild; lamellae sinuate, white, then faintly yellowish, 3–6 mm. wide, ventricose, crowded; stipe 5–10 cm. long, 1–2 cm. thick, equal but enlarged at the base, white, then faintly yellowish, silky-fibrillose, apex white flocculose, solid; Spores white in mass, subellipsoidal, 5–6 × 3–4 μ.

Hab. on the ground in woods or under trees. Early summer. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), China, Europe.

Jap. name. *Yukiwari* (KAWAMURA).

8. *Tricholoma verrucipes* (FR.) QUÉL.

Fl. Myc. 272, 1888—SACC. Fl. Ital. Crypt., Hymen. 141, 1915—RICKEN, Blätterp. 330, 1915—BRES. Icon. Myc. II, pl. 68, 1927.

Armillaria verrucipes FR. apud QUÉL. Champ. Jura Vosg., 1 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 317, 1872; Ibid. II, in l. c., V, pl. 2, f. 1, 1873—SACC. Syll. Fung. V, 78, 1887.

Agaricus (Armillaria) verrucipes FR. Hymen. Eur. 43, 1874—WINT. Die Pilze, I, 832, 1884.

Gyrophila (Armillaria) verrucipes QUÉL. Ench. Fung. 10, 1886.

Gregarious or solitary, rarely subcaespitose, edible. Pileus 3–14 cm. broad, at first subconical, then expanded to umbonate or plane, at length slightly depressed at the center, but with a small umbo; surface milk-white, finally often yellowish, silky, glabrous or very slightly flocculose, rarely cracked scaly, margin incurved, shortly villous and uneven; context white, thick, odour farinaceous, taste mild; lamellae sinuate or sinuato-adnexed, rarely adnate with a little decurrent tooth, crowded, white, finally dingy-yellowish; stipe 4–13 cm. long, 4–15 mm. thick, almost equal but with enlarged base, white, often longitudinally sulcate, silky fibrillose, verrucose with blackish dot-like warts, solid; spores white in mass, ellipsoidal, verruculose, not smooth, 8.5–10 × 5 μ.

Hab. on humus ground in woods or under trees. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Tsubu-e-no-shimeji* (n. n.).

Sect. Aggregata KONR. et MAUBL.

Icon. Sel. Fung. 304, 1935.

Pileus tenaceous, glabrous, even. Lamellae sinuate, adnexed or subdecurrent. Fructifications often caespitose.

9. *Tricholoma conglobatum* (VITT.) SACC.

Syll. Fung. V, 126, 1887—BARLA, Champ. Alp. Marit. 56, pl. 42, f. 8–15, 1890—RICKEN, Blätterp. 360, 1915.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 177, 1904—SHIRAI, List Jap. Fung. 100, 1905; ed. 2, 665, 1917; ed. 3, 397, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 117, 1931]

Agaricus conglobatus VITT. Fung. Mang. 349, 1835—FR. Epicr. Myc. 46, 1838; Hymen. Eur. 69, 1874—WINT. Die Pilze, I, 814, 1884—SCHROET. Pilze Schles. I, 660, 1889.

Clitocybe conglobata BRES. Fung. Trid. I, 27, pl. 32, 1883—SACC. Fl. Ital. Crypt., Hymen. 181, 1915—REA, Brit. Basid. 279, 1922—LANGE, Agar. Denm. VIII, 59, 1930.

Tricholoma Shimeji KAWAMURA, Ill. Jap. Fung. pl. 13, f. 8–10, 1915.

Caespitose or gregarious, edible. Pileus 5–10 cm. broad, convex, then expanded, plane or slightly depressed; surface at first drab, olive-brown or blackish, then fading to avellaneous or drab at the center, paler on the margin, smooth, dry, but nearly viscid or hygrophanous in rainy weather, margin at first involute, thin and white pruinose, finally irregular and lobed; context white, fleshy, fragile, then tough, taste mild, odour faint; lamellae sinuate or adnate, sometimes with a decurrent tooth, whitish, then cream colored, crowded, narrow; stipe 5–10 cm. long, 1–2 cm. thick, equal or thickened toward the base, at first conspicuously bulbous, often connate at the tuberous base, white or grayish, floccosely pulverulent, then smooth, solid; spores white in mass, globose, slightly rough, 4–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Teine-mura).

Distr. Japan (Hokkaido, Honshu), Europe, North America and Siberia.

Jap. name. *Shimeji* (KAWAMURA).

10. *Tricholoma humosum* (FR.) IMAI, comb. nov.

Agaricus (Clitocybe) humosus FR. Epicr. Myc. 66, 1838; Hymen. Eur. 92, 1874.

Clitocybe humosus QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 87, 1872—GILL. Hymen. Fr. 163, 1874—SACC. Syll. Fung. V, 162, 1887.

Caespitose or gregarious, edible. Pileus 3–10 cm. broad, convex then plane, gibbous, sometimes slightly umbonate, either circinate and regular or flexuose and undulate; surface light drab or drab to chaetura-drab when young, then discolered to drab or nearly cinnamon-buff at the center, often with powdery appearance to the naked eye, but under lens slightly silky adpressedly villose, margin shortly striate and grayish powdery but under lens it is silky adpressedly villose; context white, not blackening when touched or bruised, odour subfarinaceous or almost none, taste mild, firm, subcartilaginous;

lamellae adnexed, sinuate or decurrent, white, crowded, thin, rather narrow; stipe 5–10 cm. long, 1–2.5 cm. thick, equal or slightly enlarged or rarely slightly attenuated at the base, whitish or smoky-gray, nearly fibrous, apex white and pruinose, often whitish furfuraceous all over the surface, subcartilaginous, firm, solid; spores white in mass, globose, smooth, 6–7 μ.

Hab. on humus ground in woods or under trees or rarely on roadsides. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Usuzumi-shimeji* (n. n.).

The identification of this fungus has been confused because of the related species. BRESADOLA formerly considered the present species as identical with *Agaricus conglobatus* VITT. and later with *Ag. cinerascens* BULL. KONRAD and MAUBLANC treated it as a synonym of *Ag. aggregatus* SCHAEFF. The specimens at hand answer very well to the description given by FRIES, except that they have a larger pileus.

Subgen. **Melaleuca** (PAT.) IMAI, nom. nov.

Melaleuca (ut gen.) PAT. l. c. 1887.
Melanoleuca (ut gen.) PAT l. c. 1900.

Pileus hygrophanus. Stipes leviter subcartilaginus. Sporae albae, verruculosae.

11. ***Tricholoma grammopodium*** (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 83, 1872—GILL. Hymen. Fr. 129, 1874—KARST. Hattsv. I, 51, 1879—SACC. Syll. Fung. V, 133, 1887; Fl. Ital. Crypt., Hymen. 154, 1915—BARLA, Champ. Alp. Marit. 60, pl. 46, f. 1–7, 1890—RICKEN, Blätterp. 354, pl. 96, f. 3, 1915—REA, Brit. Basid. 239, 1922—BRES. Icon. Myc. III, pl. 124, 1927—LANGE, Agar. Denm. IX, 32, 1933.

Agaricus grammopodius BULL. Champ. Fr. pl. 548, 1791 (teste FR.).

Agaricus (Clitocybe) grammopodius FR. Syst. Myc. I, 93, 1821—BERK. in SMITH, Brit. Fl. V, (2), 37, 1836.

Agaricus (Tricholoma) grammopodius FR. Epicr. Myc. 50, 1838; Hymen. Eur. 74, 1874—WINT. Die Pilze, I, 810, 1884.

Gyrophila (Tricholoma) grammopodia QUÉL. Ench. Fung. 17, 1886.

Solitary or gregarious, edible. Pileus 7–15 cm. broad, campanulate, then convex, at length flattened, obtusely umbonate; surface

smooth, moist, pellicle separable, sayal-brown, darker (verona-brown) at the center, margin incurved at first; context whitish, thick, spongy, taste none, odour farinaceous or mouldy; lamellae adnate with a decurrent tooth, adnexed or sinuate, whitish, then becoming brownish, very crowded, broad, edge wavy or denticulate, often branched behind; stipe 7–10 cm. long, 1–2 cm. thick, equal, but enlarged or subbulbous at the base, whitish, longitudinally striate with bister or brownish fibrils, elastic, firm, stuffed; spores white in mass, broadly ellipsoidal, verruculose, 7–8 × 5–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Ô-zarami-no-shimeji* (n. n.).

12. *Tricholoma melaleucum* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 83, 1872—GILL. Hymen. Fr. 128, cum icone, 1874—KARST. Hattsv. I, 52, 1879—SACC. Syll. Fung. V, 134, 1887; Fl. Ital. Crypt., Hymen. 155, 1915—BARLA, Champ. Alp. Marit. 60, pl. 46, f. 8–15, 1890—MASS. Brit. Fung. Fl. III, 218, 1893—W. G. SM. Brit. Basid. 43, 1908—RICKEN, Blätterp. 355, pl. 93, f. 4, 1915—KAUFFM. Agar. Mich. 713, 1918—REA, Brit. Basid. 239, 1922—BRES. Icon. Myc. III, pl. 125, 1927—LANGE, Agar. Denm. IX, 32, 1933.

[P. HENN. in ENGLERS Bot. Jahrb. XXXII, 41, 1903—MATSUM. Ind. Pl. Jap. I, 177, 1904—SHIRAI, List Jap. Fung. 100, 1905; ed. 2, 665, 1917; ed. 3, 397, 1927]

Agaricus melaleucus PERS. Syn. Fung. 355, 1801 (teste FR.).

Agaricus (Clitocybe) melaleucus FR. Syst. Myc. I, 114, 1821.

Agaricus (Tricholoma) melaleucus FR. Epicr. Myc. 51, 1838; Hymen. Eur. 74, 1874—CKE. Ill. Brit. Fung. pl. 119, 1883—WINT. Die Pilze, I, 809, 1884—SCHROET. Pilze Schles. I, 658, 1889.

Gyrophila (Tricholoma) melaleuca QUÉL. Ench. Fung. 17, 1886.

Solitary or scattered, edible. Pileus 3–10 cm. broad, convex, then expanded, umbonate or nearly plane, depressed around the small umbo; surface hygrophanous, fuliginous when moist, fading (avellaneous) when dry, disc slightly darker, glabrous, margin incurved when young, usually entire; context white, thin, soft, odour very slightly farinaceous, taste mild; lamellae emarginate-adnexed, white, then tinged with yellowish tint, very crowded, rather narrow, waved on edge; stipe 4–10 cm. long, 4–10 mm. thick, cylindrical, equal, but usually subbulbous at the base, white and furfuraceous above, fuliginously fibrillose below, darker at the base, slightly fading when dry,

elastic, stuffed; spores white in mass, ellipsoidal, finly echinulate, 7.5–10 × 5–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Sapporo, Mt. Kurodake), Kushiro (Lake side of Akan), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Europe, North America and Australia.

Jap. name. *Ko-zarami-no-shimeji* (n. n.).

Subgen. **Rhodopaxillus** (R. MAIRE) IMAI, nom. nov.

Rhodopaxillus (ut gen.) R. MAIRE, Ann. Myc. XI, 338, 1913.

Sporae in cumulo subincarnatae. Lamellae a carne pilei leviter separabiles.

13. *Tricholoma personatum* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 82, 1872 —GILL. Hymen. Fr. 119, cum icone, 1874—KARST. Hattsv. I, 50, 1879—SACC. Syll. Fung. V, 130, 1887; Fl. Ital. Crypt., Hymen. 149, 1915—BARLA, Champ. Alp. Marit. 58, pl. 45, f. 1–5, 1890—MASS. Brit. Fung. Fl. III, 215, 1893—ATKINS. Mushrooms, ed. 2, 87, f. 87–88, 1903—W. G. SM. Brit. Basid. 42, 1908—ROLLAND, Atlas Champ. 24, f. 30, 1910—KAWAMURA, Ill. Jap. Fung. pl. 6, f. 7–8, 1913—RICKEN, Blätterp. 352, pl. 95, f. 3, 1915—KAUFFM. Agar. Mich. 707, 1918—REA, Brit. Basid. 236, 1922—LANGE, Agar. Denm. IX, 30, 1933.

[YASUDA, Bot. Mag. (Tokyo), XXV, (442), 1911—SHIRAI, List Jap. Fung. ed. 2, 665, 1917]

Agaricus bicolor PERS. Syn. Fung. 281, 1801 (teste FR.)—SCHROET. Pilze Schles. I, 658, 1889.

[P. HENN. Hedw. XXXIX, (156), 1904—MATSUM. Ind. Pl. Jap. I, 176, 1904—SHIRAI, List Jap. Fung. 100, 1905; ed. 2, 665, 1917; ed. 3, 397, 1927—YASUDA, Bot. Mag. (Tokyo), XXV, (442), 1911]

Agaricus (Tricholoma) personatus FR. Syst. Myc. I, 50, 1821; Epicr. Myc. 48, 1838; Hymen. Eur. 72, 1874—BERK. Outl. Brit. Fung. 105, pl. 5, f. 1, 1860—WINT. Die Pilze, I, 810, 1884.

Lepista personata CKE. Handb. Brit. Fung. I, 193, 1871.

Rhodopaxillus personatus R. MAIRE, Ann. Myc. XI, 338, 1913.

Gregarious or solitary, edible. Pileus 10–15 cm. broad, convex, then plane, at length depressed at the center; surface reddish-drab, pale salmon color or whitish, moist in wet weather, opaque when dry, pruinose, smooth, margin whitish, incurved at first; context white,

tinged with light violet color, compact, then spongy, thick, taste mild, odour not strong; lamellae sinuate or broadly adnexed, violaceous, then light grayish violet, crowded; stipe 7–10 cm. long, 1.5–3 cm. thick, nearly equal, bulbous at the base, whitish, tinged with light violet color, covered with evanescent fibrils, solid; spores white or faintly drab colored, ellipsoidal, mostly ventricose, 6–9 × 4.5–6 μ, mostly 9 × 4.5 μ.

Hab. on the ground in woods. Autumn. Ishikari (Sapporo, Nopporo), Kushiro (Mt. Meakan), Kitami (Oketo forest), Oshima (Ôno-mura).

Distr. Japan (Hokkaido, Honshu), Siberia, Europe, North America and Australia.

Jap. name. *Ô-murasaki-shimeji* (KAWAMURA).

14. *Tricholoma nudum* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 82, 1872—GILL. Hymen. Fr. 120, cum icone, 1874—KARST. Hattsv. I, 50, 1879—SACC. Syll. Fung. V, 131, 1887; Fl. Ital. Crypt., Hymen. 148, 1915—MASS. Brit. Fung. Fl. III, 216, 1893—W. G. SM. Brit. Basid. 43, 1908—ROLLAND, Atlas Champ. 24, f. 31, 1910—RICKEN, Blätterp. 352, pl. 95, f. 4, 1915—KAUFFM. Agar. Mich. 709, 1918—REA, Brit. Basid. 237, 1922—LANGE, Agar. Denm. IX, 30, 1933.

Agaricus nudus BULL. Champ. Fr. pl. 439, 1791 (teste FR.).

Agaricus (*Tricholoma*) *nudus* FR. Syst. Myc. I, 52, 1821; Epicr. Myc. 48, 1838; Hymen. Eur. 72, 1874—BERK. Outl. Brit. Fung. 105, pl. 4, f. 7, 1860—KICKX, Fl. Crypt. Flandr. II, 141, 1867—WINT. Die Pilze, I, 810, 1884—SCHROET. Pilze Schles. I, 658, 1889—CKE. Handb. Austr. Fung. 13, 1892.

Lepista nuda CKE. Handb. Brit. Fung. I, 192, 1871.

Rhodopaxillus nudus R. MAIRE, Ann. Myc. XI, 338, 1913.

Gregarious, subcaespitose or solitary, edible. Pileus 3.5–8 cm. broad, convex, then expanded to plane, sometimes depressed at the center; surface glabrous, even, moist, entirely purplish violaceous, soon discoloring to pale vinaceous-brown or dingy rose-color, margin incurved; context soft, thin, tinged with violet, becoming whitish when dry, odour and taste mild; lamellae truncated-adnate or rounded, then subdecurrent and slightly sinuate, crowded, narrow, violaceous or subconcolorous, becoming paler when dry; stipe 4–8 cm. long, 5–10 mm. thick, equal or slightly enlarged at the base, violaceous or subconcolorous, discoloring when dry or in age, subglabrous below, silky-pruinose above, subelastic, solid; spores sordid flesh-color in mass, ellipsoidal, verruculose, 6–8 × 3–5 μ.

Hab. on the ground in woods. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America and Australia.

Jap. name. *Murasaki-shimeji* (KAWAMURA).

Subgen. **Micromphale** (MURRILL) IMAI, nom. nov.

Micromphale (ut gen.) MURRILL, l.c. 1916, p. p.
Pleurotus Auct. plur. p. min. parte.

Stipes plerumque subcentralis, excentricus centralisve, truncigenus. Pileus siccus vel udus, glaber. Sporae albae.

15. ***Tricholoma ulmarium*** (BULL. ex FR.) KARST.

Hattsv. I, 46, 1879.

Agaricus ulmarius BULL. Champ. Fr. pl. 510, 1791 (teste FR.)—SOW. Engl. Fung. pl. 67, 1797 (teste FR.).

Agaricus (*Pleurotus*) *ulmarius* FR. Syst. Myc. I, 186, 1821; Epicr. Myc. 130, 1838; Hymen. Eur. 167, 1874—CORDA, Champ. Fr. II, 82, pl. 18, f. 2, 1870—CKE. Ill. Brit. Fung. pl. 227, 1883—WINT. Die Pilze, I, 739, 1884.

Pleurotus ulmarius QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 111, 1872—GILL. Hymen. Fr. 342, 1874—SACC. Syll. Fung. V, 341, 1887; Fl. Ital. Crypt., Hymen. 320, 1915—MASS. Brit. Fung. Fl. III, 366, 1893—ATKINS. Mushrooms, ed. 2, 102, f. 105–106, 1903—RICKEN, Blätterp. 449, 1915—KAUFFM. Agar. Mich. 659, pl. 141, 1918—REA, Brit. Basid. 442, 1922—BRES. Icon. Myc. VI, pl. 281, f. 1, 1928—LANGE, Agar. Denm. VIII, 26, 1930.

Agaricus (*Tricholoma*) *ulmarius* SCHROET. Pilze Schles. I, 659, 1889.

Micromphale ulmarius MURRILL, North Amer. Fl. IX, 307, 1916.

Caespitose or solitary, edible. Pileus 4.5–15 cm. broad, convex, then expanded, disc-shaped, obtuse; surface glabrous, moist, whitish, grayish, yellowish or brownish, often marbled with rounded livid spots; context white, firm, compact, thick, odour farinaceous, taste pleasant; lamellae sinuate or adnexed, white, close to subdistant, broad; stipe 3–7 cm. long, 1–2 cm. thick, nearly equal, fusiformly attenuated or thickened at the base, subcentral, excentric or central, straight or curved, white or whitish, glabrous or slightly or densely tomentose, firm, elastic, solid; spores white in mass, globose, 4–6 μ, smooth.

Hab. on decaying or living wood of deciduous trees. Autumn. Ishikari (Nopporo), Kushiro (Lake side of Akan), Kitami (Oketo forest), Oshima (Shiriuchi).

Distr. Japan (Hokkaido, Honshu), Europe and North America.

Jap. name. *Shiro-tamogitake* (IMAI).

When the fungus grows from the side of a trunk, the stipe is more or less excentric and ascending, but when growing on top of a substratum the stipe is central and erect. The writer considers that the present fungus ought to be treated under the genus *Tricholoma*.

Clitocybe (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 61 & 85, 1872.

Agaricus § *Clitocybe* FR. Syst. Myc. I, 78, 1821, p. p.; Epicr. Myc. 55, 1838.
Paxillus § *Lepista* FR. Epicr. Myc. 315, 1838.
Lepista W. G. SM. in SEEM. Journ. Bot. VIII, 248, 1870.

Fructification without universal and partial veils. Pileus fleshy, regular, confluent and homogeneous with the fleshy stipe. Stipe central, fleshy. Lamellae fleshy, decurrent, rarely anastomosing and separable from the context of pileus. Spores white or sordid white in mass.

Type species: *Agaricus* (*Clitocybe*) *nebularis* BATSCH ex FR.

Key to the subgenera, sections and species in Hokkaido.

I. Lamellae not easily separable from the context of pileus .... Subgen. Euclitocybe.
  A. Pileus fleshy, not hygrophanous.
    1. Pileus fleshy, usually thick, convex then plane or depressed, regular, obtuse; lamellae at first adnate or regularly adnato-decurrent .... Sect. Disciformes.
      a. Pileus cinereous, fuliginous or fuscous, rarely white or whitish; lamellae whitish.
        α. Fructification large, 4.5–20 cm.; stipe enlarged at the base .... *C. nebularis* (1).
        β. Fructification medium in size, 3–6 cm.; stipe bulbous at the base .... *C. clavipes* (2).
      b. Pileus orange-ochraceous; lamellae orange, repeatedly, dichotomous-branching, crowded .... *C. aurantiaca* (3).
      c. Pileus entirely white, medium in size; lamellae white .... *C. cerussata* (4).

2. Pileus attenuated from a fleshy disc toward the margin, at length infundibuliform or deeply umbilicate; lamellae long decurrent..... .... Sect. Infundibuliformes.
   a. *Pileus medium in size*, brownish or tan color................. .... *C. infundibuliformis* (5).
   b. Medium in size; entirely white.................. *C. catina* (6).

B. Pileus fleshy membranous, truly hygrophanous, thin, depressed, then cup-shaped.................................. Sect. Cyathiformes.
   1. *Pileus 2–7 cm. broad, fuscous-cinereous or dark bister; spores 7–10 × 4.5–6 μ* .... *C. cyathiformis* (7).
   2. Pileus 2.5–4 cm. broad, light-drab to hair-brown; spores 5 × 2.5 μ .. .. *C. fallax* (8).

II. Lamellae rather easily separable from the pileus.......... Subgen. Lepista.
   A. *Large in size, without umbo, white or yellowish*....... *C. gigantea* (9).
   B. Medium in size, with a slight obtuse umbo, whitish or yellowish........ .... *C. extenuata* (10).

Subgen. Euclitocybe IMAI, subgen. nov.

Lamellae ab hymenophoro non facile secedentes.

Sect. Disciformes FR.

Epicr. Myc. 55, 1838.

Pileus fleshy, convex then plane or depressed, regular, obtuse. Lamellae at first adnate or regularly adnato-decurrent.

1. *Clitocybe nebularis* (BATSCH ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 85, 1872—GILL. Hymen. Fr. 157, cum icone, 1874—KARST. Hattsv. I, 57, 1879—SACC. Syll. Fung. V, 142, 1887; Fl. Ital. Crypt., Hymen. 170, 1915—BARLA, Champ. Alp. Marit. 63, pl. 48, f. 1–9, 1892—MASS. Brit. Fung. Fl. II, 405, 1893—W. G. SM. Brit. Basid. 46, 1908—ROLLAND, Atlas Champ. 29, f. 47, 1910—RICKEN, Blätterp. 375, pl. 103, f. 1, 1915—KAUFFM. Agar. Mich. 725, 1918—REA, Brit. Basid. 269, 1922—BRES. Icon. Myc. III, pl. 133, 1928—LANGE, Agar. Denm. VIII, 43, 1930.

Agaricus pileolarius BULL. Champ. Fr. pl. 400, 1788 (teste FR.).

Agaricus nebularis BATSCH, Elench. Fung. II, 25, f. 193, 1789 (teste FR.).

Agaricus mollis BOLT. Hist. Fung. Halif. I, 63, 1795 (teste FR.).

Agaricus (Clitocybe) nebularis FR. Syst. Myc. I, 86, 1821; Epicr. Myc. 55, 1838; Hymen. Eur. 79, 1874—BERK. Outl. Brit. Fung. 107, 1860—CKE. Handb. Brit. Fung. I, 35, 1871; Ill. Brit. Fung. pl. 79, 1883—WINT. Die Pilze, I, 806, 1884—SCHROET. Pilze Schles. I, 657, 1889.

Omphalia nebularis QUÉL. Ench. Fung. 20, 1886.

Clitocybe pileolaria MURRILL, Mycologia, VII, 268, 1915.

Gregarious or solitary, edible. Pileus 4.5–15 cm. broad, conical, convex, then nearly plane, at length depressed at the center, margin incurved when young, at length upturned; surface drab, gray or rarely whitish, dry, commonly pruinose, margin lighter; context fleshy, white, rather compact, thick, odour and taste pleasant; lamellae decurrent, white or rarely cream-colored, close, rather narrow; stipe 6–8 cm. long, 8–22 mm. thick, equal or attenuated upward, enlarged at the base, white or gray, grayish floccosely striate; context white, solid, fibrous, elastic, nearly spongy; spores white in mass, ellipsoidal, $6–9 \times 4.5–6\ \mu$, mostly $7.5 \times 4.5\ \mu$, smooth.

Hab. on the ground in woods, among fallen leaves. Autumn. Ishikari (Sapporo, Nopporo), Kushiro (Lake side of Akan), Kitami (Oketo-forest).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Haiiroshimeji* (IMAI).

Forma *alba* (LANGE) IMAI, comb. nov.

Clitocybe nebularis var. *alba* LANGE, Agar. Denm. VIII, 43, 1930.

Pileo albo; cetera ut in Specio.

Hab. on the ground in woods, among fallen leaves. Autumn. Kushiro (Lake side of Panketo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Shiro-no-haiiroshimeji* (n. n.).

2. *Clitocybe clavipes* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 85, 1872—GILL. Hymen. Fr. 155, cum icone, 1874—KARST. Hattsv. I, 57, 1879—SACC. Syll. Fung. V, 143, 1887; Fl. Ital. Crypt., Hymen. 171, 1915—MASS. Brit. Fung. Fl. II, 405, 1893—W. G. SM. Brit. Basid. 47, 1908—ROLLAND, Atlas Champ. 29, f. 45, 1910—RICKEN, Blätterp. 375, pl. 103, f. 3, 1915—MURRILL, North Amer. Fl. IX, 410, 1916—KAUFFM. Agar. Mich. 726, 1918—REA, Brit. Basid. 269, 1922—BRES. Icon. Myc. III, pl. 135, 1928—LANGE, Agar. Denm. VIII, 46, 1930.

Agaricus (Gymnopus) clavipes PERS. Syn. Fung. 353, 1801 (teste FR.).

Agaricus (Clitocybe) clavipes FR. Syst. Myc. I, 86, 1821; Epicr. Myc. 56, 1838; Hymen. Eur. 79, 1874—CKE. Ill. Brit. Fung. pl. 80, 1883—WINT. Die Pilze, I, 805, 1884—SCHROET. Pilze Schles. I, 656, 1889.

Agaricus carnosior PK. 23 Ann. Rep. N. Y. State Cab. 76, 1872 (teste MURR.).

Omphalia clavipes QUÉL. Ench. Fung. 20, 1886.

Clitocybe carnosior SACC. Syll. Fung. V, 146, 1887.

Gregarious, solitary or rarely subcaespitose, edible. Pileus 2.5–7 cm. broad, convex, then plane, almost obconic, rarely umbonate, obtuse; surface grayish-brown or sooty-brown, sometimes darker at the center, dry, glabrous, even, margin thin, strongly incurved at first; context white, soft, thick at the center, taste and odour agreeable; lamellae deeply decurrent, white, sometimes yellowish, subdistant, flaccid, broad at the middle; stipe 3–6 cm. long, 6–10 mm. thick, attenuated upward, largely thickened or subbulbous at the base and up to 2 cm. thick, subconcolorous or paler, glabrous or slightly fibrillose, soft, elastic, solid; spores white in mass, ellipsoidal, smooth, 5.5–7.5 × 3.5–5 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Hotei-shimeji* (n. n.).

3. *Clitocybe aurantiaca* (WULF. ex FR.) STUDER

Hedw. XXXIX, (7), 1900—REA, Brit. Basid. 273, 1922.

Agaricus aurantiacus WULF. in JACQ. Miscell. Austr. II, 101, pl. 14, f. 3, 1781 (teste FR.).

Cantharellus aurantiacus FR. Syst. Myc. I, 318, 1821; Epicr. Myc. 365, 1838; Monogr. Hymen. Suec. II, 206, 1863; Hymen. Eur. 455, 1874—BERK. Outl. Brit. Fung. 215, pl. 14, f. 1, 1860—CORDA, Champ. Fr. II, 129, pl. 32, f. 2, 1870—CKE. Handb. Brit. Fung. I, 227, 1871; Ill. Brit. Fung. pl. 1104, 1883; Handb. Austr. Fung. 80, 1892—GILL. Hymen. Fr. 352, cum icone, 1874—WINT. Die Pilze, I, 523, 1884—SACC. Syll. Fung. V, 483, 1887—SCHROET. Pilze Schles. I, 511, 1888—MASS. Brit. Fung. Fl. II, 320, cum fig., 1893—ATKINS. Mushrooms, ed. 2, 129, f. 127–128, 1903—ROLLAND, Atlas Champ. 53, f. 117, 1910—RICKEN, Blätterp. 4, pl. 2, f. 2, 1915—KAUFFM. Agar. Mich. 40, 1918—BRES. Icon. Myc. X, pl. 473, 1929.

Agaricus alectorolophoides SCHAEFF. Fung. Bavar. IV, Ind. 46, pl. 206, 1774 (teste FR.).

Merulius aurantiacus PERS. Syn. Fung. 488, 1801 (teste FR.).

Merulius nigripes PERS. Ibid. 489, 1801 (teste FR.).

Agaricus subcantharellus SOW. Engl. Fung. pl. 413, 1803 (teste FR.).

Cantharellus Ravenelii BERK. et CURT. Ann. Mag. Nat. Hist. 2 ser. XII, 425, 1853.

Chanterel alectrolophoides MURRILL, North Amer. Fl. IX, 169, 1910.

Gregarious, edible (after American authors). Pileus 2–9 cm. broad, convex, then plane, depressed, at length subinfundibuliform; surface orange-ochraceous to brownish-orange, sometimes paler, subtomentose, margin incurved and at length undulated; context soft, yellowish or ochraceous, thin, odour and taste mild; lamellae decurrent, bright orange or paler, rather regularly 3 to 5 times dichotomously branched, blunt at the edge, rather narrow, crowded; stipe 4–7 cm. long, 5–10 mm. thick, nearly equal or slightly attenuated upward, pale orange to ochraceous or brownish, fibrous or minutely tomentose, stuffed, sometimes hollow; spores white in mass, ellipsoidal, smooth, 5–7 × 3–5 μ.

Hab. on the ground in woods or under trees. Late summer to autumn. Iburi (Lake side of Shikotsu), Ishikari (Nopporo, Mt. Kurodake), Kushiro (Mt. Meakan), Kitami (Notoro forest, Oketo forest), Tokachi (Mt. Nupkaushinupuri).

Distr. Japan (Hokkaido) Europe, North America, Australia, Siberia and Asia Minor.

Jap. name. *Hiroha-anzutake* (n. n.).

A form occurs with yellowish white pileus and stipe, but we have not collected a white form which FRIES has noted. Many European authors have regarded it as poisonous or suspected, but KAUFFMAN, PECK, MCILVAIN and others have eaten it without bad results.

4. *Clitocybe cerussata* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 86, 1872 —GILL. Hymen. Fr. 151, cum icone, 1874—KARST. Hattsv. I, 64, 1879—SACC. Syll. Fung. V, 154, 1887; Fl. Ital. Crypt., Hymen. 167, 1915—BARLA, Champ. Alp. Marit. 67, pl. 51, f. 24–28, 1892—MASS. Brit. Fung. Fl. II, 413, 1893—W. G. SM. Brit. Basid. 49, 1908—REA, Brit. Basid. 275, 1922—BRES. Icon. Myc. III, pl. 142, 1928.

Agaricus (*Clitocybe*) *cerussatus* FR. Syst. Myc. I, 92, 1821; Epicr. Myc. 61, 1838; Hymen. Eur. 86, 1874—PERS. Myc. Eur. III, 119, 1822—BERK. Outl. Brit. Fung. 108, 1860—CKE. Ill. Brit. Fung. pl. 122, 1883—SCHROET. Pilze Schles. I, 654, 1889.

Caespitose or gregarious, edible. Pileus 4–8 cm. broad, convex or subcampanulate, then expanded, obtuse or gibbous, at length slightly depressed; surface white, with a white-lead appearance, at first floccoso-fibrillose, then subglabrous, margin involute, villous, often sublobate or undulate; context white, mild, inodorous; lamellae

adnate, then slightly decurrent, very crowded, white; stipe 3–8 cm. long, 5–10 mm. thick, equal or thickened and often subconnate at the base, subglabrous, but white-flocculose at the base, stuffed; spores white in mass, subglobose or broadly ovoid, 5–6 × 4–5 μ or 4–5 μ.

Hab. on the ground in woods. Autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido), Siberia, Europe.

Jap. name. *Kabu-inushimeji* (n. n.).

Sect. Infundibuliformes FR.

Epicr. Myc. 67, 1838.

Pileus fleshy, not hygrophanous, attenuated from a fleshy disc toward the margin, at length infundibuliform or deeply umbilicate; lamellae long decurrent.

5. *Clitocybe infundibuliformis* (SCHAEFF. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 88, 1872 —GILL. Hymen. Fr. 144, cum icone, 1874—KARST. Hattsv. I, 71, 1879—SACC. Syll. Fung. V, 165, 1887; Fl. Ital. Crypt., Hymen. 191, 1915—BARLA, Champ. Alp. Marit. 71, pl. 57, f. 1–5, 1892—MASS. Brit. Fung. Fl. II, 425, 1893—W. G. SM. Brit. Basid. 52, 1908—ROLLAND, Atlas Champ. 30, f. 51, 1910—RICKEN, Blätterp. 373, pl. 101, f. 2, 1915—MURRILL, North Amer. Fl. IX, 408, 1916—KAUFFM. Agar. Mich. 736, pl. 158, 1918—REA, Brit. Basid. 281, 1922—BRES. Icon. Myc. IV, pl. 156, 1928—LANGE, Agar. Denm. VIII, 46, 1930.

[SHIRAI, List Jap. Fung. ed. 2, 145, 1917; ed. 3, 86, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 117, 1931]

Agaricus infundibuliformis SCHAEFF. Fung. Bavar. IV, Ind. 49, pl. 212, 1774 (teste FR.).

Agaricus (Clitocybe) infundibuliformis FR. Epicr. Myc. 68, 1838; Hymen. Eur. 93, 1874—BERK. Outl. Brit. Fung. 110, pl. 5, f. 2, 1860—CKE. Ill. Brit. Fung. pl. 107. 1883—WINT. Die Pilze, I, 795, 1884—SCHROET. Pilze Schles. I, 652, 1889.

Gregarious, subcaespitose or solitary, edible. Pileus 4–12 cm. broad, convex-umbilicate, at length infundibuliform; surface brownish, pale tan-color or flesh color, fading with age, usually darker at the center, silky fibrous or minutely squamulose, margin involute and silky; context white, thick at the center, soft, taste mild, odour agreeable; lamellae long decurrent, white or whitish, rather crowded, thin, rather narrow; stipe 4–12 cm. long, 4–8 mm. thick, nearly equal

or slightly attenuated upward, pinkish-buff, firm, elastic, base white tomentose, solid; spores white in mass, ellipsoidal with a bent end or ovoid, 8.5–12.5 × 4–5 μ, not quite smooth.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Siberia, Asia Minor, Europe, North America, ?Australia.

Jap. name. *Kayatake* (SHIRAI).

Some of the specimens at hand do not exactly agree in the spores with the description of the European and American species. These spores are ellipsoidal, 8.5–12.5 × 4–5 μ and not smooth. SACCARDO, however, has remarked in this species after BRESADOLA (M.S.) that the spores of this fungus are variable in size, namely, 5–8 × 3.5–4; 6–8 × 3.5–4.5; 7–9 × 4–5; 6–11 × 4–5.5 μ and in general 6–9 × 4–4.5 μ.

6. ***Clitocybe catinus*** (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 235, 1872—GILL. Hymen. Fr. 137, 1874—KARST. Hattsv. I, 76, 1879—SACC. Syll. Fung. V, 174, 1887; Fl. Ital. Crypt., Hymen. 187, 1915—BARLA, Champ. Alp. Marit. 75, pl. 61, f. 3–5, 1892—MASS. Brit. Fung. Fl. II, 431, 1893—W. G. SM. Brit. Basid. 54, 1908—RICKEN, Blätterp. 364, pl. 99, f. 5, 1915—MURRILL, North Amer. Fl. IX, 402, 1916—KAUFFM. Agar. Mich. 735, 1918—REA, Brit. Basid. 284, 1922.

Agaricus (Clitocybe) catinus FR. Epicr. Myc. 72, 1838; Hymen. Eur. 99, 1874—CKE. Ill. Brit. Fung. pl. 111, 1883—WINT. Die Pilze, I, 792, 1884.

Gregarious or scattered, edible. Pileus 2–6 cm. broad, convex, then depressed, at length nearly infundibuliform, rather regular; surface white, becoming discolored with age, dry, glabrous, smooth, margin incurved; context white, thin, flaccid, taste mild, odour farinaceous; lamellae decurrent, crowded, white, becoming dull whitish or dull yellowish when dried, narrow; stipe 3–6 cm. long, 2–6 mm. thick, equal or rarely slightly thickened at the base, terete, straight, white, becoming sordid, glabrous above, tomentose below, elastic, tough, stuffed then hollow; spores whitish in mass, ovate or subellipsoidal, smooth, 4–5 × 4 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo), Oshima (Ônomura).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Ko-shiro-inushimeji* (n. n.).

Sect. Cyathiformes FR.

Epicr. Myc. 73, 1838.

Pileus fleshy-membranous, thin, depressed, then cup-shaped, truly hygrophanous.

7. *Clitocybe cyathiformis* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 89, 1872—GILL. Hymen. Fr. 148, cum icone, 1874—KARST. Hattsv. I, 77, 1879—SACC. Syll. Fung. V, 176, 1887; Fl. Ital. Crypt., Hymen. 198, 1915—BARLA, Champ. Alp. Marit. 76, pl. 62, f. 6–10, 1892—MASS. Brit. Fung. Fl. II, 433, 1893—W. G. SM. Brit. Basid. 55, 1908—ROLLAND, Atlas Champ. 31, f. 52, 1910—RICKEN, Blätterp. 376, pl. 104, f. 1, 1915—KAUFFM. Agar. Mich. 739, pl. 159, 1918—REA, Brit. Basid. 285, 1922—BRES. Icon. Myc. IV, pl. 175, 1928—LANGE, Agar. Denm. VIII, 53, 1930.

Agaricus cyathiformis BULL. Champ. Fr. pl. 575, f. M, 1791.

Agaricus (Omphalia) cyathiformis FR. Syst. Myc. I, 173, 1821—BERK. in SMITH, Engl. Fl. V, (2), 68, 1836.

Agaricus (Clitocybe) cyathiformis FR. Epicr. Myc. 73, 1838; Hymen. Eur. 100, 1874—CKE. Ill. Brit. Fung. pl. 113, 1883—WINT. Die Pilze, I, 791, 1884—SCHROET. Pilze Schles. I, 651, 1889.

Gregarious, subcaespitose or solitary, edible. Pileus 2–7 cm. broad, depressed convex with strongly involute margin, then broadly infundibuliform or cup-shaped; surface hygrophanous, fuligineous-brown when young and moist, becoming brownish-gray when dry or old, glabrous or innately fibrillose, opaque, margin involute; context watery, concolorous, spongioso-fibrillose, odour and taste none; lamellae adnate, then decurrent, not crowded, grayish-brown, connate at the base, sometimes branched, narrow; stipe 4–8 cm. long, 4–8 mm. thick, attenuated upward or nearly equal, paler than the pileus or concolorous, fibrillosely reticulated, white tomentose at the base, elastic, spongy-stuffed; spores white in mass, ellipsoidal or elliptic-ovate, smooth, $7–10 \times 4.5–6\ \mu$.

Hab. on rotten wood, logs, etc., or in humus, in woods. Autumn. Ishikari (Nopporo, Sapporo), Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan), Kitami (Oketo forest), Oshima (Ônomura).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Kuro-sakazuki-shimeji* (n. n.).

8. *Clitocybe fallax* IMAI, sp. nov.

Gregaria. Pileo 2.5–4 cm. lato, depresso vel umbilicato, dein subinfundibuliformi, hygrophano, subumbrino vel umbrino, pallescente, glabro, margine involuto, leve vel vix striatulo; carne pallida, tenuissima; lamellis decurrentibus vel adnatis, confertis, pallidis vel subcinereis, arcuatis; stipite 2.5–4 cm. longo, 2–4 mm. crasso, aequali, subconcolori, leviter fibrilliso, obscure reticulato, cavo; sporis in cumulo albis, ellipsoideis, 5 × 2.5 μ, laevibus.

Hab. on decayed wood in coniferous woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Nise-kuro-sakazuki* (n. n.).

The present species is closely related to *Clitocybe subconcava* PECK, from which it is distinguishable by its darker colored and almost non-striate pileus, and by the evidently hollow stipe. The fungus also is allied to *Cl. concava* (FR.) QUÉL. in the macroscopic features but quite differs in the microscopic characters.

Subgen. **Lepista** (FR.) IMAI, nom. nov.

Paxillus § *Lepista* FR. Epicr. Myc. 315, 1838.

Lamellae usually anastomosing behind, discreting and easily separable from the pileus.

9. *Clitocybe gigantea* (SOW. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 88, 1872—GILL. Hymen. Fr. 143, cum icone, 1874—KARST. Hattsv. I, 70, 1879—BARLA, Champ. Alp. Marit. 70, pl. 56, 1892—MASS. Brit. Fung. Fl. II, 423, 1893—KAUFFM. Agar. Mich. 719, 1918—LANGE, Agar. Denm. VIII, 42, 1930.

Agaricus giganteus SOW. Engl. Fung. pl. 244, 1803 (teste FR.).

Agaricus (*Clitocybe*) *giganteus* FR. Monogr. Hymen. Suec. II, 118, 1863—CKE. Ill. Brit. Fung. pl. 106, 1883.

Paxillus giganteus FR. Hymen. Eur. 401, 1874—WINT. Die Pilze, I, 574, 1884—SACC. Syll. Fung. V, 983, 1887; Fl. Ital. Crypt., Hymen. 665, 1916—RICKEN, Blätterp. 93, 1915—REA, Brit. Basid. 549, 1922.

[T. ITO, Journ. Jap. Bot. VII, 1, 1931]

Solitary or scattered, edible. Pileus 3–20 cm. or more broad, convex, soon expanded to plane, finally infundibuliform, without

umbo; surface white or tinged tan or clay, silky flocculose, minutely adpresso-squamulose, often guttate, margin strongly involute and pubescent at first, then spreading and becoming almost smooth, at length revolute and sulcate, often splitting; context relatively thin, soft, fleshy, white; odour and taste mild; lamellae long decurrent, subdecurrent or adnato-decurrent, very crowded, narrow, whitish, then tan-color, somewhat furcate and anastomosing, easily separable from the pileus; stipe rather short and stout, 2–7 cm. or more long, 2–5 cm. thick, equal, smooth or minutely pubescent, whitish, subconcolorous or slightly darker and longitudinally striate when old, solid; spores white in mass, ellipsoidal, 8–10 × 5–6 μ, rough.

Hab. on the ground in woods. Late summer to autumn. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Ô-itchô-take* (T. Ito).

10. *Clitocybe extenuata* (Fr.) Imai, comb. nov.

Paxillus extenuatus Fr. Epicr. Myc. 316, 1838; Hymen. Eur. 402, 1874—Sacc. Syll. Fung. V, 985, 1887—Mass. Brit. Fung. Fl. II, 6, 1893—Ricken, Blätterp. 93, pl. 27, f. 2, 1915—Rea, Brit. Basid. 549, 1922.

Lepista extenuata Karst. Hattsv. I, 480, 1879.

?*Clitocybe piceina* Pk. Bull. Torrey Bot. Club, XXXI, 178, 1904—Kauffm. Agar. Mich. 720, pl. 154, 1918.

?*Melanoleuca albissima* Murrill, North Amer. Fl. X, 8, 1914.

Gregarious, caespitose or solitary, edible. Pileus 3–11 cm. broad, convex, subumbonate or gibbous, then plane with a slightly obtuse umbo; surface whitish or yellowish, the center darker and colored buff-yellow, dry, smooth, subglabrous, margin involute, pubescent, rigid-fragile, obscurely striate when matured; context white, compact or rather spongy-fleshy, thick, taste mild, odour not strong; lamellae emarginate with a long decurrent tooth or decurrent, decurrent lines or ridges running down the stipe and anastomosing, separable from the trama of pileus and stipe, transversely split in edge, whitish or slightly yellowish, close, rather narrow, thin, tough, edge entire or waved especially near the stipe; stipe 6–11 cm. long, 8–18 mm. thick, nearly equal, or slightly attenuated upward and swollen at the base, slightly rooting, whitish or yellowish, paler than the pileus, fibrous, obscurely pruinose at the apex, often tomentose at the base, stout, solid, firm, elastic, slightly spongy; spores white in mass, broadly ellipsoidal, 6–8 × 4–6 μ, rough.

Hab. on the ground in woods or under trees. Late summer to autumn. Ishikari (Sapporo, Nopporo, Jôzankei), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido), Europe and North America.

Jap. name. *Shiro-itchô-take* (n. n.).

Laccaria BERK. et BR.

Ann. Mag. Nat. Hist. 5 ser. XII, 370, 1883.
Agaricus § *Clitocybe* Auct. plur. p. min. parte.
Clitocybe Auct. plur. p. min. parte.
Camarophyllum KARST. Hattsv. I, xvii, 1879, p. min. parte.
Russuliopsis SCHROET. Pilze Schles. I, 622, 1889.

Fructification without universal and partial veils. Pileus fleshy, regular, confluent and homogeneous with the fleshy stipe. Stipe central, subfleshy, externally fibrous. Lamellae subfleshy, adnate or adnexed with a decurrent tooth, pulverulent. Spores white in mass, globose, rarely ellipsoidal, echinulate or verrucose.

Type species: *Agaricus laccatus* SCOP. ex FR.

Key to the species in Hokkaido.

I. Fructification, especially lamellae, salmon or flesh color.
  A. Pileus large, 2–5 cm. or more broad .... *L. laccata* (1).
  B. Pileus small, 5–10 mm. broad, margin almost not striate .... *L. laccata* f. *minuta* (1a).
II. Fructification, especially lamellae, dark-state-purple .... *L. amethystea* (2).
III. Fructification gray .... *L. murina* (3).

1. *Laccaria laccata* (SCOP. ex FR.) BERK. et BR.

Ann. Mag. Nat. Hist. 5 ser. XII, 371, 1883—MASS. Brit. Fung. Fl. II, 443, 1893—ROLLAND, Atlas Champ. 31, f. 53, 1910, p. p.—REA, Brit. Basid. 290, 1922.

Agaricus laccatus SCOP. Fl. Carn. ed. 2, II, 444, 1772 (teste FR.).

Agaricus (*Clitocybe*) *laccatus* FR. Syst. Myc. I, 106, 1821; Epicr. Myc. 79, 1838; Hymen. Eur. 108, 1874—RABENH. Deut. Krypt. Fl. I, 537, 1844—BERK. Outl. Brit. Fung. 113, pl. 5, f. 3, 1860—CKE. Handb. Brit. Fung. I, 44, 1871; Ill. Brit. Fung. pl. 139, 1883, p. p.—WINT. Die Pilze, I, 785, 1884, p. p.

Clitocybe laccata QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 91, 1872, p. p.—GILL. Hymen. Fr. 174, cum icone, 1874, p. p.—SACC.

Syll. Fung. V, 197, 1887; Fl. Ital. Crypt., Hymen. 206, 1915—BARLA, Champ. Alp. Marit. 79, pl. 64, f. 1–10, 1892, p. p.—RICKEN, Blätterp. 382, pl. 100, f. 2, 1915, p. p.—KAUFFM. Agar. Mich. 747, 1918—BRES. Icon. Myc. IV, pl. 187, f. 1, 1928.

[SHIRAI, List Jap. Fung. 22, 1905; ed. 2, 145, 1917; ed. 3, 86, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 117, 1931]

Camarophyllus laccatus KARST. Hattsv. I, 231, 1879, p. p.

Russuliopsis laccata SCHROET. Pilze Schles. I, 622, 1889.

Gregarious or solitary, edible. Pileus 2–5 cm. or more broad, convex, then plane, more or less umbilicato-depressed; surface hygrophanous, salmon-buff, salmon, apricot-buff, vinaceous-pink or buff-pink in color, becoming pale when dry, glabrous, furfuraceous or minutely squamulose, sometimes silky, margin even or undulato-crisped and irregularly shaped; context concolorous, somewhat thin, firm in the stipe, taste mild; lamellae adnate, adnexed, subsinuate or adnate with a decurrent tooth, rather broad, thick, subdistant, flesh-colored, then white mealy; stipe 5–10 cm. long, 5–10 mm. thick, nearly equal, straight or flexuous, concolorous, fibrous, firm, stuffed; spores white in mass, globose, 8–9 μ, echinulate.

Hab. on the ground in woods or under trees. Summer to autumn. Ishikari (Sapporo, Nopporo, Mt. Taisetsu, Mt. Teine), Tokachi (Lake side of Shikaribetsu), Kushiro (Lake side of Kutcharo, Lake side of Akan, Mt. Meakan, Mt. Oakan), Iburi (Lake side of Shikotsu), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe, North America, Australia.

Jap. name. *Kitsune-take* (KAWAMURA).

Forma ***minuta*** IMAI, *form. nov.*

Gregaria. Pileo 5–10 mm. lato, astriato vel vix striatulo; stipite 25–35 mm. longo, 1–2 mm. crasso, basi leviter incrassato; cętera ut in Specio.

Hab. on the ground in woods. Summer. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Hime-kitsunetake* (n. n.).

The present form closely resembles *Russuliopsis laccata, rosella, pusilla* SCHROET. from which it may be distinguished by the smaller size of fructification, as well as by the almost astriate pileus. The fungus is also similar to *Laccaria tortilis* (FR.) BOUD. in the smaller

size of fructification, but it is distinguishable in the almost astriate pileus and by the quadri-spored basidium.

2. *Laccaria amethytea* [BULL.] MURRILL

North Amer. Fl. X, 1, 1914.
Agaricus amethystinus BOLT. Hist. Fung. Halif. pl. 63, 1788 (teste FR.).
Agaricus amethysteus BULL. Champ. Fr. pl. 198, 1791 (teste FR.).
Collybia amethystina QUÉL. Fl. Myc. 238, 1888.
Russuliopsis laccata f. *amethystina* SCHROET. Pilze Schles. I, 623, 1889.
Clitocybe amethystea SACC. Fl. Ital. Crypt., Hymen. 206, 1915.
Agaricus laccatus var. *amethystinus* Auct. plur.
Clitocybe laccata var. *amethystina* Auct. plur.
Laccaria laccata var. *amethystina* Auct. plur.
[KAWAMURA, Jap. Fung. no. 28, 1929—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 117, 1931]

Solitary or gregarious, edible. Pileus 1.5–3 cm. broad, broadly convex, umbilicate or depressed at the center; surface hygrophanous, cames-brown, Hay's brown or dark purple-drab when moist, grayish when dry, unpolished, pellicle often breaking up into mealy squamules or sometimes silky, sometimes undulato-crisped and irregularly shaped and slightly striate at the margin; context concolorous, somewhat thin, firm; lamellae adnate or decurrent, dark state-purple, color more persistent than in the pileus, subdistant; stipe 3–7 cm. long, 2–5 mm. thick, equal, flexuous, concolorous or slightly paler than the lamellae, hollow; spores white in mass, globose, 7.5–10 μ, verruculose.

Hab. on the ground in woods or under trees. Summer to autumn. Ishikari (Sapporo, Nopporo, Mt. Teine).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Uramurasaki* (KAWAMURA).

3. *Laccaria murina* IMAI, sp. nov.

Gregaria. Pileo 1–1.5 cm. lato, convexo vel hemigloboso, dein expanso, plano, udo et juvenile fuligineo, sicco murino vel subavellaneo, leviter velutinullo, margine primo involuto, udo striatulo sicco laevi; carne murina; lamellis adnatis, griseis, demum albopruinosis, distantibus, crassis; stipite 1.5–2.5 cm. longo, 1.5–2.5 mm. crasso, aequali vel sursum leviter attenuato, subconcolori vel leviter

pallidiori, striatulo, deorsum albo-villoso; sporis in cumulo albis, globosis, 7.5–10 μ, verruculosis.

Hab. on the ground in woods. Summer. Ishikari (Nopporo).
Distr. Endemic.
Jap. name. *Ginko-take* (n. n.).

The present fungus is easily distinguished from other species in this genus by the color of fructification.

Tribe **Pleuroteae** IMAI, nom. nov.

Pleurotées KONR. et MAUBL. Icon. Sel. Fung. 29, 1924.

Fructificatio sine velo, plerumque epixyla. Stipes excentricus, lateralis vel nullus. Lamellae adnexae, adnatae vel decurrentes.

Pleurotus (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 111, 1872, p. p.

Crepidopus S. F. GRAY, Nat. Arr. Brit. Pl. I, 616, 1821—MURRILL, North Am. Fl. IX, 304, 1916.

Agaricus § *Pleurotus* FR. Syst. Myc. I, 178, 1821, p. p.

Phyllotus KARST. Hattsv. I, xiv, 1879.

Calathinus QUÉL. Ench. Fung. 46, 1886.

Geopetalum PAT. Hymen. Eur. 127, 1887, p. p.

Geopetalum MURRILL, North Amer. Fl. IX, 298, 1916.

Fructification without universal and partial veils. Pileus fleshy or submembranous, regular or irregular. Stipe excentric, lateral or wanting. Lamellae adnexed, adnate, decurrent or radiating from a central or lateral point. Spores white in mass, rarely tinged with yellowish or lilac hues.

Type species: *Agaricus ostreatus* JACQ. ex FR.

Key to the subgenera and species in Hokkaido.

I. Stipe excentric or lateral; lamellae decurrent.......... Subgen. Concharia.
  A. Stipe usually distinct and branched; pileus whitish, yellowish, yellow or brownish, usually glabrous.................... *P. cornucopiae* (1).
  B. Stipe usually distinct but short, often caespitose-imbricate; pileus white, whitish-gray or brownish, usually glabrous.......... *P. ostreatus* (2).

C. Stipe usually distinct but very short, usually caespitose-imbricate; pileus distinctly viscid when wet and young, variously colored, dingy-yellow, reddish-brown, greenish-brown or olivaceous.......... *P. serotinus* (3).

II. Stipe usually wanting, sessile or resupinate.......... Subgen. Phyllotus.

A. Growing on coniferous wood; pileus 2–7 cm. broad, white; lamellae crowded and narrow.............................. *P. porrigens* (4).

Subgen. **Concharia** IMAI, Subgen. nov.

Agaricus § *Pleurotus* § *Concharia* FR. Epicr. Myc. 132, 1838.
Agaricus § *Pleurotus* § *Dimidiati* FR. Ibid. 134, 1838, p. p.

Stipes excentricus vel lateralis; lamellae decurrentes.

1. *Pleurotus cornucopiae* (PAUL. ex PERS.) ROLLAND

Atlas Champ. 45, f. 95, 1910—SACC. Fl. Ital. Crypt., Hymen. 324, 1915—BRES. Icon. Myc. VI, pl. 288, 1928.

[IMAI, Botany & Zoology, IV, 1131, f. 1–2, 1936]

Dendrosarcos cornucopiae PAUL. Traite Champ. II, 119, pl. 28, 1793.

Agaricus cornucopiae PERS. Myc. Eur. III, 37, 1828.

Agaricus (Pleurotus) sapidus SCHULZ. in KALCHB. Icon. Hym. Hung. pl. 8, f. 1, 1873—FR. Hymen. Eur. 171, 1874—WINT. Die Pilze, I, 737, 1884.

Agaricus (Pleurotus) cornucopioides FR. Hymen. Eur. 172, 1874.

Pleurotus cornucopioides GILL. Hymen. Fr. 345, 1874—SACC. Syll. Fung. V, 348, 1887—RICKEN, Blätterp. 447, 1915.

Pleurotus ostreatus var. *cornucopiae* QUÉL. Ench. Fung. 148, 1886.

Pleurotus sapidus SACC. Syll. Fung. V, 348, 1887—MASS. Brit. Fung. Fl. III, 370, 1893—ATKINS. Mushrooms, ed. 2, 104, f. 108, 1903—W. G. SM. Brit. Basid. 92, 1908—KAUFFM. Agar. Mich. 665, 1918—REA, Brit. Basid. 444, 1922.

[UMEMURA Pl. Fujiyama. 369, 1927]

Caespitose, edible. Pileus 4–12 cm. broad, convex, depressed at the center, excentric, lateral or rarely almost subsessile, ascending or shelving, subdimidiate or elongated; surface glabrous, rarely tomentose with a white tufted short hair, primuline-yellow, yellow or whitish, rarely brownish, margin often irregular and wavy; context rather thin, white, firm, taste mild, odour subfarinaceous; lamellae decurrent, rather distant, rarely anastomosing at the base, broad, white or whitish; stipe 2–10 cm. long, 5–15 mm. thick, varying from subsessile to long stipitate, subequal or attenuated upward but dilated in the pileus, white, whitish or yellowish, firm, entirely glabrous or slightly tomentose at the base, usually branched, curved or straight, ascending, arising from a fleshy bulbous base, solid; spores white, usually tinged lilac in mass, narrow-oblong, smooth, 7–11 × 3–5 μ.

Hab. on the trunk of deciduous trees, especially *Ulmus*. Summer to autumn. Ishikari (Sapporo, Nopporo, Sôunbetsu), Kushiro (Lake side of Akan), Kitami (Oketo), Teshio (Otoineppu).

Distr. Japan (Hokkaido, Honshu), Europe, North America, China, Siberia, Asia Minor.

Jap. name. *Nire-take* (SAKAMOTO ex IMAI), *Tamogi-take* (IMAI), *Himehira-take* (UMEMURA).

2. *Pleurotus ostreatus* (JACQ. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mem. Soc. D'Emul. Montb. 2 sér. V, 112, 1872; Ench. Fung. 148, 1886—GILL. Hymen. Fr. 346, cum icone, 1874—SACC. Syll. Fung. V, 355, 1887; Fl. Ital. Crypt., Hymen. 332, 1915—MASS. Brit. Fung. Fl. III, 371, 1893—ATKINS. Mushrooms, ed. 2, 104, f. 107, 1903—W. G. SM. Brit. Basid. 93, 1908—ROLLAND, Atlas Champ. 44, f. 93, 1910—KAWAMURA, Ill. Jap. Fung. pl. 8, f. 1–2, 1913—RICKEN, Blätterp. 450, pl. 112, f. 1, 1915—KAUFFM. Agar. Mich. 663, pl. 142, 1918—REA, Brit. Basid. 445, 1922—BRES. Icon. Myc. VI, pl. 290, 1928—LANGE, Agar. Denm. VIII, 25, 1930.

[P. HENN. Hedw. XXXIX, (156), 1900—SHIRAI, in MATSUM. & MIYOS. Crypt. Jap. Icon. Ill. I, pl. 3, 1900; List Jap. Fung. 71, 1905; ed. 2, 467, 1917; ed. 3, 286, 1927—MATSUM. Ind. Pl. Jap. I, 162, 1904—YASUDA, Bot. Mag. (Tokyo), XXVIII, (389), 1914—NAKAJI, Bot. Mag. (Tokyo), XXX, (102), 1916—UMEMURA, Pl. Fujiyama. 370, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 116, 1931]

Agaricus ostreatus JACQ. Fl. Austr. III, pl. 288, 1775 (teste FR.)—PERS. Syn. Fung. 477, 1801—Sow. Engl. Fung. pl. 241, 1803.

Crepidopus ostreatus S. F. GRAY, Nat. Arr. Brit. Pl. I, 616, 1821—MURRILL, North Amer. Fl. IX, 304, 1916.

Agaricus (Pleurotus) ostreatus FR. Syst. Myc. I, 182, 1821; Epicr. Myc. 133, 1838; Hymen. Eur. 173, 1874—BERK. in SMITH, Engl. Fl. V, (2), 71, 1836; Outl. Brit. Fung. 135, 1860—RABENH. Deutschl. Crypt. Fl. I, 516, 1844—KICKX, Fl. Crypt. Flandr. II, 158, 1867—CORDA, Champ. Fr. II, 80, 1870—CKE. Handb. Brit. Fung. I, 48, 1871; Ill. Brit. Fung. pl. 195, 1883; Handb. Austr. Fung. 31, 1892—WINT. Die Pilze, I, 735, 1884.

Clitocybe ostreatus KARST. Hattsv. I, 87, 1879.

Agaricus (Clitocybe) ostreatus SCHROET. Pilze Schles. I, 649, 1889.

Crepidopus subsapidus MURRILL, Mycologia, IV, 216, 1912.

Caespitosely imbricate, edible. Pileus 5–15 cm. or more broad, excentric or sublateral, conchate, subdimidiate to elongated, convex or depressed; surface moist, silky to glabrous, white, whitish or avellaneous to snuff-brown, (usually when young almost black, soon becoming pale, fuscous-cinereous, passing into yellow when old), margin thin, even, sometimes subrimose; context white, rather thin,

soft, taste and odour pleasant; lamellae long decurrent, anastomosing on the stipe, subclose to subdistant, white, becoming yellowish or grayish in age, broad; stipe 1–4 cm. long, 1–2 cm. thick, lateral, *sometimes excentric, short or almost lacking, stout, often tomentose* or strigose-hairy at the base, whitish, firm, solid; spores white or lilac-tinged in mass, elliptical-oblong, smooth, 8–12 × 3–4 μ.

Hab. on dead trunks of deciduous trees, or, rarely, of coniferous trees. Spring to autumn. Ishikari (Sapporo, Nopporo), Iburi (Tomakomai, Lake side of Shikotsu), Oshima (Ônomura), Kushiro (Lake side of Akan), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu, Kiushu), Europe, Siberia, Asia Minor, North America, Australia.

Jap. name. *Hira-take* (SHIRAI ex P. HENN.).

3. *Pleurotus serotinus* (PERS. ex FR.) GILL.

Hymen. Fr. 337, 1874—KARST. Hattsv. I, 89, 1879—QUÉL. Ench. Fung. 149, 1886—SACC. Syll. Fung. V, 363, 1887; Fl. Ital. Crypt., Hymen. 314, 1915—MASS. Brit. Fung. Fl. II, 374, 1893—W. G. SM. Brit. Basid. 94, 1908—RICKEN, Blätterp. 451, pl. 112, f. 3, 1915—KAUFFM. Agar. Mich. 668, 1918—REA, Brit. Basid. 447, 1922—LANGE, Agar. Denm. VIII, 27, 1930—BRES. Icon. Myc. XXV, pl. 1247, 1933.

[KAWAMURA, Journ. Jap. Bot. V, (96), 1928]

Agaricus serotinus PERS. in HOFFM. Abb. Schwamm. III, 1790 (sec. PERS.); Syn. Fung. 479, 1801.

Agaricus (Pleurotus) serotinus FR. Syst. Myc. I, 187, 1821; Epicr. Myc. 135, 1838; Hymen. Eur. 176, 1874—RABENH. Deutschl. Krypt. Fl. I, 515, 1844—BERK. Outl. Brit. Fung. 136, 1860—CKE. Handb. Brit. Fung. I, 49, 1871; Ill. Brit. Fung. pl. 258, f. B, 1883—WINT. Die Pilze, I, 734, 1884—SCHROET. Pilze Schles. I, 625, 1889.

Agaricus serotinoides PK. 23 Ann. Rept. N. Y. State Cab. 86, 1872 (teste MURRILL).

Crepidopus serotinus MURRILL, Mycologia, IV, 216, 1912; North Amer. Fl. IX, 304, 1916.

Caespitosely imbricate or gregarious, edible. Pileus 3–24 cm. broad, 2–15 cm. wide, convex to plane, dimidiate-reniform or suborbicular; surface variable in color, dingy yellow, reddish-brown, greenish-brown or olivaceous, viscid when wet in young stage, velvety or villous, pellicle easily separable, margin incurved at first, at length upturned; context white, soft, rather compact when young, thick, taste mild, odour pleasant; lamellae decurrent, close, yellowish; stipe

1.5–3.5 cm. long, 1.5–4 cm. thick, lateral, very rarely excentric, short, thick, yellowish, minutely tomentose or squamulose, with or without blackish or brownish points; spores white in mass, sausage-shaped, curved, 5.5 × 1.8 μ.

Hab. on the trunks of various deciduous trees in woods. Autumn, especially in late autumn. Oshima (Ônomura, Shiriuchi), Iburi (Chitose, Lake side of Shikotsu), Ishikari (Sapporo, Nopporo, Mt. Teine, Jôzankei, Mt. Kurodake), Tokachi (Lake side of Shikaribetsu), Kushiro (Lake side of Akan, Mt. Meakan), Kitami (Oketoforest), Kurile (Matsuwa).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Siberia.

Jap. name. *Muki-take* (IMAI, KAWAMURA).

Subgen. **Phyllotus** (KARST.) IMAI, nom. nov.

Agaricus § *Pleurotus* § *Dimidiati* FR. Epicr. Myc. 134, 1838, p. p.
Agaricus § *Pleurotus* § *Resupinati* FR. Ibid. 136, 1838.
Phyllotus KARST. l. c. 1879.

Fructificatio non stipitata, sessilis vel resupinata.

4. ***Pleurotus porrigens*** (PERS. ex FR.) GILL.

Hymen. Fr. 334, 1874—SACC. Syll. Fung. V, 374, 1887; Fl. Ital. Crypt., Hym. 311, 1915—MASS. Brit. Fung. Fl. II, 378, 1893—W. G. SM. Brit. Basid. 95, 1908—RICKEN, Blätterp. 455, 1915—KAUFFM. Agar. Mich. 671, 1918—REA, Brit. Basid. 449, 1922—BRES. Icon. Myc. VI, pl. 281, f. 2, 1928—HEMMI, Bot. Mag. (Tokyo), XLVI, 162, 1932.

Agaricus abietinus SCHRAD. Spic. Fl. Germ. 132, 1794 (teste FR.).

Agaricus porrigens PERS. Obs. Myc. I, 54, 1796 (teste FR.); Syn. Fung. 480, 1801; Myc. Eur. III, 21, 1828.

Agaricus (Pleurotus) porrigens FR. Syst. Myc. I, 184, 1821; Epicr. Myc. 136, 1838; Hymen. Eur. 178, 1874—BERK. in SMITH, Engl. Fl. V, (2), 72, 1836; Outl. Brit. Fung. 137, 1860—RABENH. Deut. Krypt. Fl. I, 514, 1844—CKE. Handb. Brit. Fung. I, 50, 1871; Ill. Brit. Fung. pl. 259, f. A, 1883—WINT. Die Pilze, I, 733, 1884—SCHROET. Pilze Schles. I, 625, 1889.

Phyllotus porrigens KARST. Hattsv. I, 92, 1879.

Pleurotus niphetus ELLIS, Bull. Torrey Bot. Club, IX, 18, 1882.

Calathinus porrigens QUÉL. Ench. Fung. 46, 1886.

Geopetalum porrigens MURRILL, Mycologia, IV, 215, 1912.

Geopetalum abietinum MURRILL, North Amer. Fl. IX, 300, 1916.

Caespitosely imbricate, edible. Pileus 2–6 cm. broad, 3–8 cm. long, at first resupinate and suborbicular with persistently inrolled margin, sessile, adnate behind, then reflexed and prolonged, ascending or horizontal, elongated ear-shaped, obovate or fan-shaped; surface pure white, glabrous except the base which is villous-tomentose, margin regular or lobed; context thin, rather brittle, white, at length creamy-yellowish, odour and taste none; lamellae at first concurrent, then decurrent, radiating, very narrow, crowded, thin, linear, forked or even, anastomosing at the base; spores white in mass, globose or subglobose, smooth, 6–7 × 6 μ.

Hab. on decayed wood of conifers. Autumn. South Saghalien (Horo). Ishikari (Nopporo), Tokachi (Lake side of Shikaribetsu).

Distr. Japan (Saghalien, Hokkaido, Honshu), Europe, North America.

Jap. name. *Sugi-hiratake* (HEMMI).

Tribe Hygrophoreae P. HENN. emend. IMAI

Hygrophoreae P. HENN. in ENGLER & PR. Naturl. Pflanzenf. I, 1**, 209, 1897, p. p.
Hygrophorées R. MAIRE, Rech. Cyt. Tax. Basid. 114, 1902, p. p.
Hygrophorées KONR. et MAUBL. Icon. Sel. Fung. 26, 1924.

Fructificatio carnosa vel ceracea, cum vel sine volo universali. Pileus cum stipite contiguus. Lamellae molles, crassae, ceraceae, vulgo distantes. Sporae in cumulo albae.

Hygrophorus FR.

Genera Hymen. 8, 1836, p. p.; Epicr. Myc. 320, 1838.
Agaricus § *Limacium* FR. Syst. Myc. I, 31, 1821.
Agaricus § *Clitocybe* § *Camarophylli* FR. Ibid. 98, 1821.
Agaricus § *Clitocybe* § *Hygrocybe* FR. Ibid. 101, 1821.
Hygrophorus § *Limacium* FR. Epicr. Myc. 320, 1838.
Hygrophorus § *Camarophyllus* FR. Ibid. 325, 1838.
Hygrophorus § *Hygrocybe* FR. Ibid. 329, 1838.
Camarophyllus KARST. Hattsv. I, xvii, 1879.
Hydrocybe KARST. Ibid. xvii, 1879.
Hygrocybe FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 307, 1889.

Limacium SCHROET. Pilze Schles. I, 530, 1889—LANGE, Agar. Denm. V, 12, 1923.

Godfrinia R. MAIRE, Rech. Cyt. Tax. Basid. 116, 1902.

Fructification with, or without, universal veil. Pileus waxy or fleshy, regular, confluent with the stipe. Stipe central, fleshy or waxy. Lamellae attached to the stipe, waxy, soft, thick, but acute at the edge, usually distant. Spores white in mass.

Type species: *Hygrophorus chrysodon* [BATSCH] FR.

Key to the subgenera, sections and species in Hokkaido.

I. Fructification usually with a viscid universal veil...... Subgen. Limacium.
  A. Pileus white or yellowish-white.
    1. Pileus and stipe white or yellowish, covered with evanescent yellow floccose squamules.......................... *H. chrysodon*(1).
    2. Entirely shining white, but becoming yellowish with age, very viscid; odour almost none...................... *H. eburneus*(2).
    3. Pileus white, but disc ochraceous, very viscid; odour strong...... .... *H. Cossus*(3).
  B. Pileus reddish.
    1. Pileus and stipe whitish with rose spots; growing in coniferous woods.................................... *H. erubescens*(4).
    2. Pileus densely covered with ochre-red, small punctations.......... .... *H. capreolarius*(5).
    3. Pileus bright reddish color, deeper at the center; growing in coniferous woods............................... *H. pudorinus*(6).
  C. Pileus citron-yellow, 2–5 cm. broad.................. *H. lucorus*(7).
  D. Pileus brownish or brown.
    1. Pileus brownish at the center, pale on margin; stipe white, viscid when wet................................. *H. arbustivus*(8).
    2. Pileus drab or buffy-brown.
      a. Stipe white or grayish, usually not glutinous-peronate........ .... *H. agathosmus*(9).
      b. Stipe white, glutinous peronate......... *H. mesotephrus*(10).

II. Fructification without veil; pileus firm, opaque, moist in rainy weather, not viscid.................................. Subgen. *Camarophyllus*.
  A. Lamellae descending, generally deeply decurrent.. Sect. Subturbinatae.
    1. Pileus white or whitish.
      a. Pileus rather fleshy, medium-sized, white or dingy whitish.... .... *H. virgineus*(11).
      b. Pileus very thin, small, pure white.
        i. Growing on ground..................... *H. niveus*(12).
        ii. Growing on dead coniferous wood...... *H. subniveus*(13).
  B. Lamellae more or less emarginate, with or without a decurrent tooth.. .... Sect. Emarginatae.
    1. Pileus avellaneous in color; context turning from white to pale-orange-pink when exposed to air............ *H. carnescens*(14).

III. Fructification without veil, thin, watery, succulent; pileus fragile, viscid when wet, *shining* when dry, rarely floccosely squamulose.. Subgen. Hygrocybe.

A. Lamellae adnato-decurrent or deeply decurrent... Sect. Adanato-decurrentes.

1. Pileus smooth, viscid.

a. Pileus lemon-yellow or waxy-yellow; lamellae yellow... *H. ceraceus*(15).

b. Pileus blood-red or bright scarlet and becoming yellow.. *H. coccineus*(16).

2. Pileus more or less squamulose, dry.

a. Pileus scarlet or vermilion; lamellae yellow.. *H. miniatus*(17).

B. Lamellae adnexed or emarginate, somewhat separating.. Sect. Emarginato-subliberae.

1. Pileus scarlet, yellow, sulphur-greenish; pileus and stipe becoming black.. *H. conicus*(18).

Subgen. **Limacium** Fr.

l. c. 1838.

Universal veil viscid, with occasionally a floccose partial one, which is annular, or marginal. Stipe clothed with scales or more frequently rough with dots above. Pileus viscid, fleshy. Lamellae adnato-decurrent.

1. *Hygrophorus chrysodon* [Batsch] Fr.

Epicr. Myc. 320, 1838; Monogr. Hym. Suec. II, 123, 1863; Hymen. Eur. 405, 1874—Berk. Outl. Brit. Fung. 197, 1860—Cke. Handb. Brit. Fung. I, 195, 1871; Ill. Brit. Fung. pl. 885, 1888—Quél. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 185, 1872; Ench. Fung. 48, 1886—Gill. Hymen. Fr. 178, cum icone, 1874—Karst. Hattsv. I, 216, 1879—Wint. Die Pilze, I, 571, 1884—Sacc. Syll. Fung. V, 387, 1887; Fl. Ital. Crypt., Hymen. 340, 1915—Mass. Brit. Fung. Fl. II, 353, 1893—Atkins. Mushrooms, ed. 2, 111, fig. 115, 1903—W. G. Sm. Brit. Basid. 256, 1908—Rolland, Atlas Champ. 32, f. 54, 1910—Kauffm. Agar. Mich. 178, 1918—Rea, Brit. Basid. 291, 1922—Bres. Icon. Myc. VII, pl. 301, 1928.

[Kawamura, Jap. Fungi, no. 45, 1929]

Agaricus Mugnaius Scop. Fl. Carn. ed. 2, II, 429, 1772 (teste Fr.).

Agaricus chrysodon Batsch, Elench. Fung. Cont. II, 79, f. 212, 1789 (teste Fr.).

Agaricus (*Limacium*) *chrysodon* Fr. Syst. Myc. I, 32, 1821.

Limacium chrysodon Schroet. Pilze Schles. I, 531, 1889—Ricken, Blätterp. 15, pl. 6, f. 4, 1915—Lange, Agar. Denm. V, 16, 1923.

Hygrophorus mugnaius Murrill, North Amer. Fl. IX, 391, 1916.

Gregarious or solitary, edible. Pileus 4–7 cm. broad, convex, then plane; surface viscid, white or yellowish, covered with evanescent, yellow, floccose squamules, which are more permanent at the involute margin; context white, sometimes reddish, rather thick, taste mild, odour not unpleasant; lamellae decurrent or adnate, white, somewhat yellowish at the edge, broad, distant, sometimes crisped; stipe 4–7 cm. long, 6–15 mm. thick, subequal, white, covered with minute, light yellow squamules, which form a zone at the apex, stuffed; spores white in mass, ellipsoidal, smooth, $7–10 \times 4–6\,\mu$.

Hab. on the ground in woods, especially in conifers. Autumn. Ishikari (Nopporo), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Africa.

Jap. name. *Ukon-gasa* (KAWAMURA).

2. *Hygrophorus eburneus* [BULL.] FR.

Epicr. Myc. 321, 1838; Monogr. Hymen. Suec. II, 123, 1863; Hymen. Eur. 406, 1874—BERK. Outl. Brit. Fung. 197, pl. 15, f. 1, 1860—KICKX, Fl. Crypt. Flandr. II, 195, 1867—CKE. Handb. Brit. Fung. I, 196, 1871; Ill. Brit. Fung. pl. 886, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 185, 1872; Ench. Fung. 49, 1886—GILL. Hymen. Fr. 180, cum icone, 1874—KARST. Hattsv. I, 217, 1879—WINT. Die Pilze, I, 570, 1884—SACC. Syll. Fung. V, 388, 1887; Fl. Ital. Crypt., Hymen. 340, 1915—MASS. Brit. Fung. Fl. II, 353, 1893—W. G. SM. Brit. Basid. 256, 1908—KAUFFM. Agar. Mich. 178, 1918—REA, Brit. Basid. 292, 1922—BRES. Icon. Myc. VII, pl. 303, 1928.

Agaricus Jozzolus SCOP. Fl. Carn. ed. 2, II, 431, 1772 (teste FR.).

Agaricus lacteus SCHAEFF. Fung. Bavar. IV, Ind. 19, pl. 39, 1774 (teste FR.).

Agaricus eburneus BULL. Champ. Fr. pl. 551, f. 2, 1791 (teste FR.)—PERS. Syn. Fung. 364, 1801.

Agaricus nitens SOW. Engl. Fung. pl. 71, 1797 (teste FR.).

Agaricus (Limacium) eburneus FR. Syst. Myc. I, 33, 1821, excl. var. b.

Limacium eburneum SCHROET. Pilze Schles. I, 530, 1889—RICKEN, Blätterp. 16, pl. 6, f. 5, 1915—LANGE, Agar. Denm. V, 15, 1923.

Gregarious, edible. Pileus 3–7 cm. broad, convex, then expanded to plane or subumbonate; surface viscid, glabrous, pure white when fresh, becoming yellowish with age, shining, margin at first involute and floccose-pubescent; context white, rather thick, firm, odour and taste mild; lamellae decurrent or adnato-decurrent, subdistant, white, often becoming dingy-yellowish with age, veined at

the base; stipe 5–10 cm. long, 5–10 mm. thick, subequal or slightly attenuated or fusiform at the base, white, often becoming dingy with age, viscid, shining-spotted when dry, rough at the spex with dots in the form of squamules, persistently stuffed or becoming hollow; spores white in mass, ellipsoidal, 6–8 × 4–5 μ, smooth.

Hab. on the ground in woods, especially in frondose woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America, Africa, Asia Minor, Siberia.

Jap. name. *Shiro-numeri-kasa* (n. n.).

3. *Hygrophorus Cossus* [Sow.] Fr.

Epicr. Myc. 321, 1838; Monogr. Hymen. Suec. II, 124, 1863; Hymen. Eur. 406, 1874—Berk. Outl. Brit. Fung. 197, 1860—Cke. Handb. Brit. Fung. I, 196, 1871; Ill. Brit. Fung. pl. 887, 1888—Quél. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 185, 1872; Ench. Fung. 49, 1886—Gill. Hymen. Fr. 179, cum icone, 1874—Karst. Hattsv. I, 217, 1879—Wint. Die Pilze, I, 570, 1884—Sacc. Syll. Fung. V, 389, 1887; Fl. Ital. Crypt., Hymen. 341, 1915—Mass. Brit. Fung. Fl. II, 354, 1893—W. G. Sm. Brit. Basid. 257, 1908—Rolland, Atlas Champ. 32, f. 55, 1910—Rea, Brit. Basid. 292, 1922—Bres. Icon. Myc. VII, pl. 304, 1928.

Agaricus Cossus Sow. Engl. Fung. pl. 121, 1799 (teste Fr.).

Agaricus (*Limacium*) *eburneus* var. b. Fr. Syst. Myc. I, 33, 1821.

Agaricus (*Limacium*) *Cossus* Berk. in Smith, Engl. Fl. V, (2), 13, 1836.

Limacium Cossum Ricken, Blätterp. 16, 1915—Lange, Agar. Denm. V, 16, 1923.

Gregarious or solitary. Pileus 4–8 cm. broad, convex, then plane, subumbonate or depressed; surface very viscid, ivory-yellow, marguerite-yellow or pale-olive-buff, disc darker and colored with dark-olive-buff or buffy-brown or only slightly darker, margin naked; context white, then yellowish or yellow, taste mild, odour strong; lamellae subdecurrent or subadnate, distant, white, then slightly yellowish, thick, connected by veins; stipe 6–12 cm. long, 6–12 mm. thick, equal but attenuated at the base, whitish, then yellowish or subconcolorous, viscid, furfuraceous and granular at the apex, stuffed, then hollow; spores white in mass, broadly ellipsoidal, 7–9 × 5–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido), Europe, Africa.

Jap. name. *Kusa-numeri-kasa* (n. n.).

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4. *Hygrophorus erubescens* FR.

Epicr. Myc. 322, 1838; Monogr. Hymen. Suec. II, 125, 1863; Hymen. Eur. 407, 1874—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 186, pl. 11, f. 1, 1872—GILL. Hymen. Fr. 181, 1874—KARST. Hattsv. I, 219, 1879—WINT. Die Pilze, I, 569, 1884—SACC. Syll. Fung. V, 390, 1887—CKE. Ill. Brit. Fung. pl. 888, 1888—MASS. Brit. Fung. Fl. II, 355, 1893—W. G. SM. Brit. Basid. 257, 1908—REA, Brit. Basid. 293, 1922—BRES. Icon. Myc. VII, pl. 306, 1928.

Agaricus rubescens PERS. Disp. Meth. Fung. 21, 1797; Syn. Fung. 366, 1801 (teste FR.).

Agaricus (*Limacium*) *erubescens* FR. Syst. Myc. I, 32, 1821.

Limacium rubescens SCHROET. Pilze Schles. I, 531, 1889.

Limacium erubescens RICKEN, Blätterp. 10, pl. 4, f. 2, 1915.

Hygrophorus rubescens SACC. Fl. Ital. Crypt., Hymen. 342, 1915.

Gregarious or solitary, edible. Pileus 5–10 cm. broad, gibbous, then convex-plane, at length slightly upturned at the margin; surface slightly viscid, whitish, spotted or colored with orange-vinaceous or ocher-red, glabrous, naked at the margin; context yellowish, taste bitterish, then sometimes slightly acrid; lamellae slightly decurrent, white, spotted or tinged with pinkish-vinaceous or orange-vinaceous, somewhat distant; stipe 5–15 cm. long, 8–15 mm. thick, nearly equal, whitish, stained or spotted concolorously, slightly fibrous external, solid; spores white in mass, ellipsoidal, 7.5–10 × 5–6 μ.

Hab. on the ground in woods, especially in coniferous woods. Autumn. Ishikari (Toyohira), Oshima (Ônomura).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Africa, Siberia.

Jap. name. *Ô-sakura-shimeji* (n. n.).

5. *Hygrophorus capreolarius* (KALCHBR.) SACC.

Fl. Ital. Crypt., Hymen. 342, 1915—BRES. Icon. Myc. VII, pl. 307, 1928.

Hygrophorus erubescens var. *capreolarius* KALCHBR. Icon. Hymen. Hung. 35, pl. 18, f. 3, 1874—FR. Hymen. Eur. 407, 1874—SACC. Syll. Fung. V, 391, 1887.

Hygrophorus erubescens subsp. *capreolarius* WINT. Die Pilze, I, 569, 1884.

Gregarious or solitary. Pileus 3–5 cm. broad, convex then expanded to umbonate, at length slightly upturned at the margin; surface dry, densely covered with ochre-red colored small punctations which lie close together at the center, but at the margin they become

pale, fuse and become pale-ochre-red; context subconcolorous or paler, odour farinaceous; lamellae long decurrent, distant, nearly concolorous to the pileus, rigid, thick, somewhat veinly conjugated; stipe 3–6 cm. long, 5–12 mm. thick, nearly equal, concolorous, slightly fibrillose-subreticulated, subsquamulose at the apex, white tomentose at the base, solid; spores white in mass, ellipsoidal, minutely rough, 6–10 × 4–5 μ (majority 7.5 × 5 μ).

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hakkaido), Europe.

Jap. name. *Ko-sakura-shimeji* (n. n.).

Macroscopic features of the present fungus coincide well with those of *H. capreolarius* which was described by BRESADOLA in his Iconographia Mycologica, but the spores are minutely rough.

6. *Hygrophorus pudorinus* FR.

Epicr. Myc. 322, 1838; Monogr. Hymen. Suec. II, 126, 1863; Hymen. Eur. 407, 1874—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 186, 1872; Ench. Fung. 49, 1886—GILL. Hymen. Fr. 181, cum icone, 1874—KARST. Hattsv. I, 219, 1879—WINT. Die Pilze, I, 569, 1884—SACC. Syll. Fung. V, 391, 1887; Fl. Ital. Crypt., Hymen. 343, 1915—MASS. Brit. Fung. Fl. II, 356, 1893—W. G. SM. Brit. Basid. 258, 1908—ROLLAND, Atlas Champ. 33, f. 58, 1910—MURRILL, North Amer. Fl. IX, 393, 1916—KAUFFM. Agar. Mich. 186, 1918—REA, Brit. Basid. 294, 1922—BRES. Icon. Myc. VII, pl. 308, 1928.

Agaricus (*Limacium*) *pudorinus* FR. Syst. Myc. I, 33, 1821.

Limacium pudorinum RICKEN, Blätterp. 10, pl. 4, f. 3, 1915.

Gregarious or scattered, edible. Pileus 5–10 cm. broad, convex, then expanded to nearly plane, obtuse; surface viscid when wet, bright reddish flesh color (pale ochraceous-buff to pale ochraceous-salmon), deeper (avellaneous, wood-brown or buffy-brown) at the center, glabrous, even, margin at first involute and minutely downy; context white or tinged flesh color especially under the pellicle, thick, compact, taste mild, odour of resin of coniferous leaves and rather disagreeable; lamellae adnato-decurrent at first, then slightly decurrent, distant, whitish at first, then tinged flesh-color, thick, often crisped; stipe 5–10 cm. long, 1–2 cm. thick, equal or attenuated downward, white or flesh color, viscid when wet, apex sometimes contracted, white and rough with floccose granules, but usually flesh coloured and floccose fibrillose or glabrescent below, stout, compact, solid; spores white in mass, cylindric-ellipsoidal, smooth, 6–9 × 4–5 μ.

Hab. on the ground in woods, especially coniferous woods (*Abies*). Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Fuki-sakura-shimeji* (n. n.).

7. *Hygrophorus lucorus* KALCHBR.

Icon. Hymen. Hung. 35, pl. 19, f. 4, 1874—FR. Hymen. Eur. 409, 1874—WINT. Die Pilze, I, 567, 1884—QUÉL. Ench. Fung. 50, 1886—SACC. Syll. Fung. V, 394, 1887; Fl. Ital. Crypt., Hymen. 346, 1915—RICKEN, Blätterp. 13, pl. 5, f. 3, 1915—BRES. Icon. Myc. VII, pl. 314, 1928.

Gregarious, edible. Pileus 3–6 cm. broad, conico-convex, then expanded and slightly depressed around the little umbo; surface glabrous or adpressed silky fibrillose, viscid, yellow, paler at the margin; context white, but yellowish under the pellicle, odour and taste none; lamellae adnato-decurrent, distant or subdistant, whitish or yellowish; stipe 3–7 cm. long, 5–10 mm. thick, equal, white above, yellowish or yellow below, enclosed by viscid fibrous veil, solid; spores white in mass, ellipsoidal, 9–11 × 5–6 μ.

Hab. on the ground in woods. Autumn. Oshima (Ônomura).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Ki-numeri-kasa* (n. n.).

8. *Hygrophorus arbustivus* FR.

Epicr. Myc. 323, 1838; Monogr. Hymen. Suec. II, 126, 1863; Hymen. Eur. 408, 1874—CKE. Handb. Brit. Fung. I, 196, 1871; Ill. Brit. Fung. pl. 896, f. A, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 186, 1872; Ench. Fung. 49, 1886—GILL. Hymen. Fr. 182, 1874—KARST. Hattsv. I, 220, 1879—WINT. Die Pilze, I, 568, 1884—SACC. Syll. Fung. V, 493, 1887; Fl. Ital. Crypt., Hymen. 344, 1915—MASS. Brit. Fung. Fl. II, 357, 1893—W. G. SM. Brit. Basid. 258, 1908—REA, Brit. Basid. 294, 1922—BRES. Icon. Myc. VII, pl. 309, 1928.

Limacium arbustivum RICKEN, Blätterp. 12, 1915.

Gregarious or caespitose, edible. Pileus 2–5 cm. broad, convex or subumbonate, then expanded to plane or slightly upturned at the margin but disc with a little umbo; surface very viscid when wet, disc liver-brown or chestnut-brown, margin paler, slightly darker when young, disc with somewhat velvety appearance, margin with innate fibrils; context tinged with reddish brown, odour none, taste

pleasant; lamellae adnate with a decurrent tooth or scarcely decurrent, white, moderately crowded; stipe 5–10 cm. long, 4–10 mm. thick, equal, cylindrical, white, slightly viscid when wet and fresh, apex with white granules; spores white in mass, ellipsoidal, 8–10 × 4–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Jôzankei).

Distr. Japan (Hokkaido, Honshu), Europe, Africa.

Jap. name. *Ko-kuri-no-kasa* (n. n.).

9. *Hygrophorus agathosmus* FR.

Epicr. Myc. 325, 1838; Monogr. Hymen. Suec. II, 129, 1863; Hymen. Eur. 411, 1874—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 188, 1872; Ench. Fung. 50, 1886—GILL. Hymen. Fr. 184, cum icone, 1874—KARST. Hattsv. I, 222, 1879—WINT. Die Pilze, I, 566, 1884—SACC. Syll. Fung. V, 397, 1887; Fl. Ital. Crypt., Hymen. 348, 1915—MASS. Brit. Fung. Fl. II, 361, 1893—W. G. SM. Brit. Basid. 259, 1908—REA, Brit. Basid. 297, 1922—BRES. Icon. Myc. VII, pl. 319, 1928.

Agaricus agathosmus FR. Obs. Myc. I, 16, 1815.

Agaricus (Limacium) pustulatus FR. Syst. Myc. I, 34, 1821, p. p.

Limacium agathosmus SCHROET. Pilze Schles. I, 533, 1889—RICKEN, Blätterp. 14, pl. 6, f. 1, 1915—LANGE, Agar. Denm. V, 14, 1923.

Gregarious, edible. Pileus 4–10 cm. broad, convex, then plane or gibbous; surface viscid, drab or buffy-down, darker at the disc, slightly paler on the margin, margin at first incurved and villous, at length reflexed and often undulate; context white, odour pleasant, taste none; lamellae deeply decurrent, white, at length yellowish, distant, soft, somewhat veined at the base, 6–8 mm. broad; stipe 5–12 cm. long, 6–15 mm. thick, equal or slightly thickened toward the base, whitish or grayish, furfuraceous-pruinose at the apex, but finally glabrescent, fibrillosely striate, solid or stuffed; spores white in mass, ellipsoidal, smooth 7.5–10 × 4–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Jôzankei).

Distr. Japan (Hokkaido), Europe, Africa.

Jap. name. *Usucha-numerikasa* (n. n.).

10. *Hygrophorus mesotephrus* BERK. et BR.

Ann. Mag. Nat. Hist. 2 ser. XIII, 7, pl. 15, f. 2, 1854; BERK. Outl. Brit. Fung. 198, 1860—CKE. Handb. Brit. Fung. I, 197, 1871—FR. Hymen. Eur. 411, 1874—SACC. Syll. Fung. V, 398, 1887; Fl. Ital. Crypt., Hymen. 349, 1915—MASS.

Brit. Fung. Fl. II, 362, 1893—W. G. SM. Brit. Basid. 259, 1908—REA, Brit. Basid. 297, 1922.

Limacium mesotephrum LANGE, Agar. Denm. V, 14, 1923.

Solitary or scattered, edible. Pileus 1.5–3 cm. broad, slightly umbonate; surface thickly covered with dark-olive-buff or buffy-brown colored gluten which gives a pale-isabelle color on the margin and olive-brown color at the center, margin slightly white-flocculose, not striate; context white, odour and taste none; lamellae decurrent, white, moderately crowded; stipe 3–4 cm. long, 4–5 mm. thick, equal, white, thickly covered with the gluten, which gives the concolorous appearance, but apex not covered with gluten and dry, white mealy, solid; spores white in mass, ellipsoidal, 7.5–10 × 5–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Hime-numeri-kasa* (n. n.).

Subgen. **Camarophyllus** FR.

l. c. 1838.

Veil none. Stipe even, glabrous or fibrillose, not rough with dots. Pileus moist, hardly viscous. Lamellae arcuate, distant.

Sect. **Subturbinatae** LANGE

Agar. Denm. V, 17, 1923.

Lamellae descending, generally deeply decurrent in the mature plant.

11. *Hygrophorus virgineus* [WULF.] FR.

Epicr. Myc. 327, 1838; Monogr. Hymen. Suec. II, 133, 1863; Hymen. Eur. 413, 1874—BERK. Outl. Brit. Fung. 199, 1860—KICKX, Fl. Crypt. Flandr. II, 196, 1869—CKE. Handb. Brit. Fung. I, 199, 1871; Ill. Brit. Fung. pl. 892, 1888; Handb. Austr. Fung. 74, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 189, 1872; Ench. Fung. 51, 1886—GILL. Hymen. Fr. 187, cum icone, 1874—WINT. Die Pilze, I, 563, 1884—SACC. Syll. Fung. V, 402, 1887; Fl. Ital. Crypt., Hymen. 355, 1915—MASS. Brit. Fung. Fl. II, 346, 1893—W. G. SM. Brit. Basid. 261, 1908—ROLLAND, Atlas Champ. 33, f. 59, 1910—RICKEN, Blätterp. 18, 1915—KAUFFM. Agar. Mich. 191, 1918—REA, Brit. Basid. 300, 1922—BRES. Icon. Myc. VII, pl. 328, 1928.

Agaricus virgineus WULF. in JACQ. Misc. Austr. II, 104, pl. 15, f. 1, 1781 (teste FR.)—SOW. Engl. Fung. pl. 32, 1797—PERS. Syn. Fung. 456, 1801.

Agaricus ericeus BULL. Champ. Fr. pl. 188, 1791 (teste FR.).

Agaricus (Clitocybe) virgineus FR. Syst. Myc. I, 100, 1821, p. p.

Camarophyllus virgineus KARST. Hattsv. I, 225, 1879—MURRILL, North Amer. Fl. IX, 386, 1916—LANGE, Agar. Denm. V, 19, 1923.

Hygrophorus ericeus SCHROET. Pilze Schles. I, 529, 1889.

Gregarious or solitary, edible. Pileus 1.5–5 cm. broad, convex, then plane, obtuse, subumbonate, finally depressed at the center; surface white, moist or dry, often cracked into areolate-rimose when moist, floccose and becoming yellowish when dry; context white, taste and odour pleasant; lamellae decurrent, distant, white, rather thick; stipe 3–5 cm. long, 5–12 mm. thick, attenuated downward, white, glabrous or pruinose, dry, solid or stuffed; spores white in mass, ellipsoidal, smooth, $6\text{–}8 \times 4\text{–}5\,\mu$.

Hab. on the ground in woods. Autumn. Oshima (Ônomura), Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Europe, North & South America, Africa, Australia.

Jap. name. *Otome-no-kasa* (n. n.).

12. *Hygrophorus niveus* [SCOP.] FR.

Epicr. Myc. 327, 1838; Monogr. Hymen. Suec. II, 133, 1863; Hymen. Eur. 414, 1874—BERK. Outl. Brit. Fung. 199, 1860—KICKX, Fl. Crypt. Flandr. II, 197, 1867—CKE. Handb. Brit. Fung. I, 199, 1871; Ill. Brit. Fung. pl. 900, f. A, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 189, 1872; Ench. Fung. 51, 1886—GILL. Hymen. Fr. 186, 1874—WINT. Die Pilze, I, 563, 1884—SACC. Syll. Fung. V, 403, 1887; Fl. Ital. Crypt., Hymen. 354, 1915—SCHROET. Pilze Schles. I, 529, 1889—MASS. Brit. Fung. Fl. II, 347, 1893—W. G. SM. Brit. Basid. 261, 1908—KAUFFM. Agar. Mich. 191, 1918—REA, Brit. Basid. 300, 1922—BRES. Icon. Myc. VII, pl. 329, 1928.

Agaricus niveus SCOP. Fl. Carn. ed. 2, II, 430, 1772 (teste FR.).

Agaricus (Clitocybe) virgineus FR. Syst. Myc. I, 100, 1821, p. p.

Camarophyllus niveus KARST. Hattsv. I, 232, 1879—LANGE, Agar. Denm. V, 19, 1923.

Hydrocybe nivea MURRILL, North Amer. Fl. IX, 377, 1916.

Gregarious, edible. Pileus 1–3 cm. broad, convex or campanulate, then expanded to umbilicate; surface viscid, snow-white, glabrous, striatulate when wet; context white, thin, odour none, taste mild; lamellae decurrent, white, distant, narrow, thin, subvenose;

stipe 2–8 cm. long, 2–5 mm. thick, equal or attenuated downward, white, glabrous, smooth, stuffed, then hollow; spores white in mass, broadly ellipsoidal, smooth, 7–8 × 4–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo), Oshima (Ônomura), Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Africa, ?Australia.

Jap. name. *Ko-otome-no-kasa* (n. n.).

13. *Hygrophorus subniveus* IMAI, sp. nov.

Gregarius vel solitarius. Pileo 5–15 mm. lato, convexo, dein leviter depresso, albo, glabro, vix viscido, udo hygrophano striatoque, carne alba, tenui, odore nullo, sapore miti; lamellis longe decurrentibus, albis, distantibus, tenuis; stipite 1–2 cm. longo, 1–2 mm. crasso, equali, albo, sericeo-nitente; sporis in cumulo albis, ellipsoideis, asperulatis, 7.5–10 × 4–5 μ.

Hab. on rotting coniferous wood (*Abies Mayriana* MIYABE et KUDO) in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Hime-otome-no-kasa* (n. n.).

The present fungus is closely allied to *H. nieveus* from which it is distinguished by its habitat and the form of pileus, as well as by the asperulate spores.

Sect. **Emarginatae** LANGE

Agar. Denm. V, 17, 1923.

Lamellae more or less emarginate, with or without a decurrent tooth.

14. *Hygrophorus carnescens* IMAI, sp. nov.

Gregarius. Pileo 5–10 cm. lato, convexo, dein expanso, obtuso, avellaneo, sicco, pulverulento, demum saepe fisso, margine leviter pallidiore incurvatoque; carne crassa, compacta, primo albida, fracta rubescente sed non nigrescente, odore farinaceo, sapore miti; lamellis sinuatis, albidulis vel flavidulis, fracta rubescentibus, distantibus,

latis; stipite 4–8 cm. longo, 1–2 cm. crasso, utrimque attenuato, albidulo, fibrilloso-striato, fracta carnescente, solido; sporis in cumulo albis, late ellipsoideis vel subobovatis, levibus, 5–6.25 × 4–5 μ.

Hab. On the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Hime-no-kasa* (n. n.).

The present fungus is related to *H. metapodius* FR. from which it is distinguishable by the paler colored pileus.

Subgen. **Hygrocybe** FR.

l. c. 1838.

Hygrocybe (ut Gen.) FAYOD, l. c. 1889.

Godfrinia (ut Gen.) R. MAIRE, l. c. 1902.

Veil none. Whole fungus thin, watery-succulent, fragile. Pileus viscid when wet, shining when dry, rarely floccosely squamose. Stipe hollow, soft, not punctate. Lamellae soft.

Sect. **Adnato-decurrentes** LANGE

Agar. Denm. V, 22, 1923.

Lamellae adnato-decurrent.

15. ***Hygrophorus ceraceus*** [WULF.] FR.

Epicr. Myc. 330, 1838; Monogr. Hymen. Suec. II, 138, 1863; Hymen. Eur. 417, 1874—BERK. Outl. Brit. Fung. 201, 1860—KICKX, Fl. Crypt. Flandr. II, 197, 1867—CKE. Handb. Brit. Fung. I, 201, 1871; Ill. Brit. Fung. pl. 904, f. B, 1888; Handb. Autsr. Fung. 75, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 191, 1872; Ench. Fung. 52, 1886—GILL. Hymen. Fr. 193, 1874—WINT. Die Pilze, I, 561, 1884—SACC. Syll. Fung. V, 412, 1887; Fl. Ital. Crypt., Hymen. 360, 1915—SCHROET. Pilze Schles. I, 528, 1889—MASS. Brit. Fung. Fl. II, 334, 1893—W. G. SM. Brit. Basid. 263, 1908—MURRILL, Mycologia, II, 160, pl. 27, f. 2, 1910—RICKEN, Blätterp. 24, 1915—KAUFFM. Agar. Mich. 193, 1918—REA, Brit. Basid. 304, 1922—BRES. Icon. Myc. VII, pl. 342, 1928.

Agaricus ceraceus WULF. in JACQ. Misc. Austr. II, 105, pl. 15, f. 2, 1781 (teste FR.)—SOW. Engl. Fung. pl. 20, 1797.

Agaricus (Clitocybe) ceraceus FR. Syst. Myc. I, 102, 1821.

Hygrocybe ceracea KARST. Hattsv. I, 234, 1879—MURRILL, North Amer. Fl. IX, 378, 1916.

Godfrinia ceracea R. MAIRE, Rech. Cyt. Tax. Basid. 123, 1902.

Gregarious, edible. Pileus 1–4 cm. broad, convex to plane, obtuse; surface viscid, pale-yellow or waxy-yellow, sometimes tinged orange, not pallescent, pellucid, glabrous, slightly striate on the margin; context concolorous, fragile; lamellae broadly adnate to subdecurrent, broad behind to subtriangular, thickish, distant, concolorous, connected by veins; stipe 2–6 cm. long, 2–5 mm. thick, equal or sometimes unequal, terete, at length compressed, straight or flexuous, concolorous, glabrous, slightly viscid, soon dry, shining, undulate, hollow; spores white in mass, ellipsoidal, smooth, 6–8 × 4 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Australia, Asia.

Jap. name. *Ki-yama-take* (n. n.).

16. *Hygrophorus coccineus* [SCHAEFF.] FR.

Epicr. Myc. 330, 1838; Monogr. Hymen. Suec. II, 139, 1863; Hymen. Eur. 417, 1874—BERK. Outl. Brit. Fung. 201, 1860—KICKX, Fl. Crypt. Flandr. II, 197, 1867—CKE. Handb. Brit. Fung. I, 201, 1871; Ill. Brit. Fung. pl. 920, 1888; Handb. Austr. Fung. 75, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 191, 1872; Ench. Fung. 53, 1886—GILL. Hymen. Fr. 194, cum icone, 1874—WINT. Die Pilze, I, 560, 1884—SACC. Syll. Fung. V, 412, 1887—MASS. Brit. Fung. Fl. II, 335, 1893—W. G. SM. Brit. Basid. 264, 1908—MURRILL, Mycologia, II, 162, pl. 27, f. 7, 1910—RICKEN, Blätterp. 23, 1915—KAUFFM. Agar. Mich. 196, pl. 30, 1918—REA, Brit. Basid. 304, 1922—BRES. Icon. Myc. VII, pl. 344, 1928.

Agaricus miniatus SCOP. Fl. Carn. ed. 2, II, 442, 1772 (teste FR.).

Agaricus coccineus SCHAEFF. Fung. Bavar. IV, Ind. 70, pl. 302, 1774 (teste FR.).

Agaricus (*Clitocybe*) *coccineus* FR. Syst. Myc. I, 105, 1821.

Hydrocybe coccinea KARST. Hattsv. I, 234, 1879—LANGE, Agar. Denm. V, 25, 1923.

Hygrophorus miniatus (non FR.) SCHROET. Pilze Schles. I, 528, 1889.

Hydrocybe miniata (non KARST.) MURRILL, North Amer. Fl. IX, 380, 1916.

Gregarious, said to be edible. Pileus 2–6 cm. broad, campanulate or convex, then expanded, finally subumbonate; surface viscid when wet, bright scarlet, fading to pale-red, and finally yellowish, glabrous, even, margin incurved at first, not upturned when mature; context thin, yellowish, fragile, odour and taste none; lamellae adnate with a decurrent tooth, subdistant to distant, pale-yellow to reddish,

broad, connected by veins; stipe 5–9 cm. long, 5–10 mm. thick, nearly equal or slightly attenuated upward, concolorous, becoming yellow, paler at the base, often compressed and furrowed, undulate-uneven, fibrous or glabrous, stuffed then hollow; spores white in mass, broadly ellipsoidal, smooth, 6–10 × 4–6 μ.

Hab. on the ground in woods. Kushiro (Mt. Meakan). Autumn.

Distr. Japan (Hokkaido, Honshu), Europe, North America, Australia.

Jap. name. *Beni-yamatake* (n. n.).

17. *Hygrophorus miniatus* Fr.

Epicr. Myc. 330, 1838; Monogr. Hymen. Suec. II, 139, 1863; Hymen. Eur. 418, 1874—Berk. Outl. Brit. Fung. 201, 1860—Kickx, Fl. Crypt.Flandr. II, 198, 1867—Cke. Handb. Brit. Fung. I, 202, 1871; Ill. Brit. Fung. pl. 921, f. A, 1888; Handb. Austr. Fung. 76, 1892—Quél. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 191, 1872; Ench. Fung. 53, 1886—Gill. Hymen. Fr. 194, *cum icone*, 1874—Wint. Die Pilze, I, 560, 1884—Sacc. Syll. Fung. V, 413, 1887—Mass. Brit. Fung. Fl. II, 336, 1893—W. G. Sm. Brit. Basid. 264, 1908—Murrill, Mycologia, II, 163, pl. 27, f. 9, 1910—Kawamura, Ill. Jap. Fung. pl. 1, f. 27–29, 1912—Ricken, Blätterp. 24, pl. 8, f. 9, 1915—Kauffm. Agar. Mich. 195, 1918—Rea, Brit. Basid. 305, 1922—Bres. Icon. Myc. VII, pl. 337, f. 2, 1928.

[P. Henn. Hedw. XXXIX, (156), 1900—Matsum. Ind. Pl. Jap. I, 148, 1904]

Agaricus flammeus Scop. Fl. Carn. ed. 2, II, 443, 1772 (teste Fr.).

Agaricus (*Clitocybe*) *miniatus* Fr. Syst. Myc. I, 105, 1821.

Hydrocybe miniata Karst. Hattsv. I, 234, 1879—Lange, Agar. Denm. V, 27, 1923.

Hygrophorus flammans Schroet. Pilze Schles. I, 528, 1889.

Hydrocybe flammea Murrill, North Amer. Fl. IX, 381, 1916.

Gregarious or subcaespitose, edible. Pileus 0.5–3 cm. or more broad, convex, then expanded to plane, at length umbilicate; surface slightly viscid when wet, vermilion, rarely yellow, then becoming pale and opaque, minutely tomentose, at length minutely squamulose, sometimes glabrous, even, fragile; context yellow, thin, odour and taste mild; lamellae adnate or very slightly decurrent, yellow or orange-red, at length paler, distant or subdistant, thickish; stipe 2–7 cm. long, 2–5 mm. thick, equal, concolorous or slightly paler, glabrous, shining, stuffed, then hollow; spores white in mass, broadly ellipsoidal, 6–9 × 4–6 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Matsuyama).

Distr. Japan (Hokkaido, Honshu), Europe, India, North America, Australia.

Jap. name. *Akanuma-benitake* (SHIRAI, ex P. HENN.).

Sect. **Emarginato-subliberae** LANGE

Agar. Denm. V, 22, 1923.

Lamellae emarginato-subliberate.

18. ***Hygrophorus conicus*** [SCOP.] FR.

Epicr. Myc. 331, 1838; Monogr. Hymen. Suec. II, 142, 1863; Hymen. Eur. 419, 1874—BERK. Outl. Brit. Fung. 202, 1860—KICKX, Fl. Crypt. Flandr. II, 198, 1867—CKE. Handb. Brit. Fung. I, 203, 1871; Ill. Brit. Fung. pl. 908, 1888; Handb. Austr. Fung. 76, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 192, 1872; Ench. Fung. 53, 1886—GILL. Hymen. Fr. 192, cum icone, 1874—WINT. Die Pilze, I, 559, 1884—SACC. Syll. Fung. V, 418, 1887, Fl. Ital. Crypt., Hymen. 366, 1915—MASS. Brit. Fung. Fl. II, 339, 1893—SCHROET. Pilze Schles. I, 526, 1889—W. G. SM. Brit. Basid. 265, 1908—MURRILL, Mycologia, II, 162, pl. 27, f. 8, 1910—ROLLAND, Atlas Champ. 33, f. 57, 1910—KAWAMURA, Ill. Jap. Fung. pl. 4, f. 18–19, 1912—RICKEN, Blätterp. 21, pl. 8, f. 4, 1915—KAUFFM. Agar. Mich. 200, 1918—REA, Brit. Basid. 307, 1922.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 148, 1904—UMEMURA, Pl. Fujiyama. 367, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 113, 1931]

Agaricus conicus SCOP. Fl. Carn. ed. 2, II, 443, 1772 (teste FR.).

Agaricus (*Clitocybe*) *conicus* FR. Syst. Myc. I, 103, 1821.

Hydrocybe conica KARST. Hattsv. I, 236, 1879—MURRILL, North Amer. Fl. IX, 379, 1916—LANGE, Agar. Denm. V, 24, 1923.

Godfrinia conica R. MAIRE, Rech. Cyt. Tax. Basid. 117, 1902.

Gregarious or solitary, edible. Pileus 2–5 cm. broad, campanulate, conical, usually acute, not fully expanded; surface viscid when wet, some shade of red or yellow, at times tinged with green, almost always turning black on drying or in age, margin often splitting-expanded or lobed; context concolorous, very thin, becoming black when bruised or old; lamellae almost free, pallid to sulphur-yellow, sometimes reddish at the base, becoming black, ventricose, thin, rather crowded to somewhat distant; stipe 3–10 cm. long, 3–7 mm. thick, equal or slightly enlarged toward the base, terete, concolorous or citron to golden-yellow, becoming black, straight or twisted, fibril-

losely-striate, often splitting longitudinally, hollow; spores white in mass, broadly ellipsoidal, smooth, 8–11 × 6–8 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo, Mt. Kurodake), Iburi (Lake side of Shikotsu), Kushiro (Mt. Meakan).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America, Australia.

Jap. name. *Akayama-take* (SHIRAI ex P. HENNINGS).

Tribe Collybieae IMAI, nom. nov.

Collybiées KONR. et MAUBL. Icon. Sel. Fung. 28 & 235, 1924–35, p. p.

Fructificatio putrescens vel revivescens, sine volva annuloque. Pileus cum stipite cartilagine confluentus sed a stipite heterogenus. Lamellae cum stipite adhaerentes vel liberae. Sporae in cumulo albae.

Key to the genera.

I. Fructification fleshy, subfleshy or membranous, putrescent.
  A. Lamellae adnate or sinuato-adnate.
    1. Margin of pileus at first incurved or exceeding the lamellae...... .... *Collybia.*
    2. Margin of pileus straight, at first adpressed to the stipe......... .... *Mycena.*
  B. Lamellae decurrent.. *Omphalia.*
II. Fructification subfleshy or membranous, tough, not putrescent, reviving with moisture.. *Marasmius.*

Collybia (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 61 & 92, 1872.

Gymnopus ROUSSEL, Fl. Calvados, ed. 2, 62, 1806—EARLE, Bull. N. Y. Bot. Gard. V, 428, 1909—MURRILL, North Amer. Fl. IX, 352, 1916.

Agaricus § *Collybia* FR. Syst. Myc. I, 9 & 129, 1821, p. p.

Agaricus § *Collybia* FR. Epicr. Myc. 81, 1838; Hymen. Eur. 3 et 109, 1874.

Lyophyllum KARST. Acta Soc. Faun. Fl. Fenn. II, 3, 1881.

Marasmius § *Collybia* KARST. Finl. Basidsv. 96, 1889.

Tephrophana EARLE, Bull. N. Y. Bot. Gard. V, 427, 1909.

Collybidium EARLE, Ibid. V, 428, 1909.

Fructification without volva and annulus. Pileus fleshy or membranous, regular, margin at first incurved. Stipe central, cartilaginous. Lamellae adnate, adnexed or free, usually white or bright colored, sometimes gray or blackish. Spores white in mass, rarely colored with yellowish or other hues.

Type species: *Agaricus radicatus* RELH. ex FR.

Key to the sections and species in Hokkaido.

I. Stipe stout or rarely slender, sulcate or fibrillosely striate............... .... Sect. Striaepedes.
- A. Lamellae broad, subdistant.
  - 1. Fructification usually large; pileus glabrous, viscid when wet; stipe usually long-rooting.......................... *C. radicata* (1).
  - 2. Pileus usually streaked with dark colored fibrils, not viscid; stipe usually not long-rooted.
    - a. Fructification usually large, and solitary or scattered; stipe with white mycelial strands.............. *C. platyphylla* (2).
    - b. Fructification usually small, caespitose or densely gregarious on coniferous wood......................... *C. lacerata* (3).
- B. Lamellae narrow, crowded.
  - 1. Fructification usually large; pileus and stipe white then spotted with reddish color............................ *C. maculata* (4).
  - 2. Fructification medium-sized; pileus variable in color, usually brown when wet and paler when dry; stipe rufous or bister............ .... *C. butyracea* (5).

II. Stipe usually slender, equal, velvety, floccose or pruinose................ .... Sect. vestipedes.
- A. Pileus yellow or brown, rarely yellowish, viscid when wet; stipe umber, blackish or yellow, densely velvety; lamellae broad, subdistant........ .... *C. velutipes* (6).

III. Stipe slender, equal, fistulose, glabrous................. Sect. Laevipedes.
- A. Lamellae broad, rather distant; pileus brown or paler; stipe long, rooting, strigose below, mostly growing on cones of conifers............ .... *C. esculenta* (7)
- B. Lamellae narrow and crowded; pileus incarnate when wet, whitish when dry; stipe rufous............................ *C. acervata* (8).

Sect. Striaepedes FR.

Epicr. Myc. 81, 1838; Hymen. Eur. 109, 1874.

Stipe stout, hollow or stuffed, sulcate or fibrillosely striate.

1. *Collybia radicata* (RELH. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 92, 1872; Ench. Fung. 27, 1886—GILL. Hymen. Fr. 311, cum icone, 1874—KARST. Hattsv. I, 140, 1879—SACC. Syll. Fung. V, 200, 1887—MASS. Brit. Fung. Fl. III, 120, 1893—ATKINS. Mushrooms, ed. 2, 92, f. 94, 1903—W. G. SM. Brit. Basid. 59, 1908—ROLLAND, Atlas Champ. 46, f. 98, 1910—KAWAMURA, Ill. Jap. Fung. pl. 3, f. 1-4, 1912—RICKEN, Blätterp. 406, pl. 106, f. 1, 1915—KAUFFM. Agar. Mich. 766, pl. 167, 1918—REA, Brit. Basid. 326, 1922—BRES. Icon. Myc. IV, pl. 189, 1928. [UMEMURA, Pl. Fujiyama. 366, 1923]

Agaricus macrourus var. α SCOP. Fl. Carn. ed. 2, II, 423, 1772 (teste FR.).

Agaricus radicatus RELH. Fl. Cantabr. no. 1040, 1785 (teste FR.)—SOW. Engl. Fung. pl. 48, 1797.

Agaricus (Clitocybe) radicatus FR. Syst. Myc. I, 118, 1821.

Agaricus (Collybia) radicatus FR. Epicr. Myc. 81, 1838; Hymen. Eur. 109, 1874—BERK. Outl. Brit. Fung. 114, pl. 5, f. 4, 1860—KICKX, Fl. Crypt. Flandr. II, 145, 1867—CKE. Handb. Brit. Fung. I, 53, 1871; Ill. Brit. Fung. pl. 140, 1883; Handb. Austr. Fung. 17, 1892—WINT. Die Pilze, I, 783, 1884.

Agaricus (Collybia) Macrourus SCHROET. Pilze Schles. I, 648, 1889.

Collybia macroura GRAMBERG, Pilze Heimat. I, 38, pl. 39, 1913—SACC. Fl. Ital. Crypt., Hymen. 230, 1915.

Gymnopus radicatus MURRILL, North Amer. Fl. IX, 366, 1916.

Solitary or gregarious, edible. Pileus 5–11.5 cm. broad, convex, then becoming nearly plane; surface viscid when wet, avellaneous, drab or tawny, rarely whitish, with radiate or anastomose wrinkles at the center, margin slightly incurved, with anastomosing wrinkles or smooth; context white, thin, taste and odour none; lamellae white or yellowish, adnate or adnexed, with a decurrent tooth, distant, broad; stipe 7–33 cm. long, 5–15 mm. thick, attenuated upward, usually with a long tail-like fusiform root, yellowish or grayish, with bister colored powdery spots, at length striate-sulcate, cartilaginous, hollow; spores white in mass, subglobose or broadly ellipsoidal, rarely globose, 15–16.5 × 12–13.5 μ, apiculate, smooth.

Hab. on the ground, especially on humus soil of decayed wood or on decaying tree trunks. Summer to autumn. Ishikari (Sapporo, Nopporo, Jôzankei, Mt. Teine, Mt. Taisetsu), Iburi (Chitose, Lake side of Shikotsu), Kushiro (Mt. Meakan).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe, North America, Australia.

Jap. name. *Tsue-take* (KAWAMURA).

The present fungus varies greatly in size and color. The fusiform root is commonly observed on the fungus growing on the soil

or on much decayed wood, while on the fungus growing on less decayed wood, it is not observed usually. The latter form may be mistaken for as *Collybia retigera* BRES. from which it is distinguished by the larger spores.

2. *Collybia platyphylla* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 93, 1872 —GILL. Hymen. Fr. 313, cum icone, 1874—KARST. Hattsv. I, 141, 1879—SACC. Syll. Fung. V, 203, 1887—MASS. Brit. Fung. Fl. III, 121, 1893—ATKINS. Mushrooms, ed. 2, 93, 1903—W. G. SM. Brit. Basid. 60, 1908—RICKEN, Blätterp. 406, pl. 107, f. 1, 1915—KAUFFM. Agar. Mich. 767, 1918—REA, Brit. Basid. 328, 1922.

Agaricus grammocephalus BULL. Champ. Fr. pl. 594, 1793 (teste FR.).

Agaricus platyphyllus PERS. Obs. Myc. I, 47, 1796 (teste FR.); Syn. Fung. 362, 1801.

Agaricus repens FR. Obs. Myc. I, 14, 1815.

Agaricus (Clitocybe) platyphyllus FR. Syst. Myc. I, 117, 1821.

Agaricus (Collybia) platyphyllus FR. Epicr. Myc. 82, 1838; Hymen. Eur. 110, 1874—BERK. Outl. Brit. Fung. 114, 1860—KICKX, Fl. Crypt. Flandr. II, 146, 1867—CKE. Handb. Brit. Fung. I, 54, 1871; Ill. Brit. Fung. pl. 128, 1883—WINT. Die Pilze, I, 782, 1884.

Collybia grammocephala QUÉL. Ench. Fung. 27, 1886—SACC. Fl. Ital. Crypt., Hymen. 229, 1915—BRES. Icon. Myc. IV, pl. 191, 1928.

Agaricus (Collybia) grammocephalus SCHROET. Pilze Schles. I, 648, 1889.

Gymnopus platyphyllus MURRILL, North Amer. Fl. IX, 367, 1916.

Solitary or gregarious, edible. Pileus 7–14 cm. broad, papillate-convex or convex, then plane; surface dry, moist in wet, grayish brown to blackish, streated with dark brown fibrils, center darker, margin incurved at first; context thin, fragile, whitish; lamellae adnate or slightly sinuate, obliquely truncate behind, white, broad, distant, soft, edge wavy or subserrate and tinged with dark-brown color; stipe 8–10 cm. long, 1–1.5 cm. equal, whitish, grayish, silky, apex somewhat pruinose, fibrillosely striate, often striated sulcate, stout, base blunt and attached to white mycelial strands, pellicle cartilaginous, fibrous-fleshy, stuffed or hollow; spores white in mass, broadly ellipsoidal, 7.5–10 × 6–7.5 μ.

Hab. on or around decayed wood in woods. Early summer to autumn. Ishikari (Sapporo, Nopporo, Mt. Tengu), Kushiro (Mt Meakan), Kuriles (Kunashiri Is.).

Distr. Japan (Hokkaido, Honshu), China, Siberia, Asia Minor Europe, North America.

Jap. name. *Hirohida-take* (KAWAMURA).

3. *Collybia lacerata* (LASCH) GILL.

Hymen. Fr. 310, 1874—QUÉL. Ench. Fung. 33, 1886—SACC. Syll. Fung. V, 247, 1887; Fl. Ital. Crypt., Hymen. 214, 1915—MASS. Brit. Fung. Fl. III, 149, 1893—W. G. SM. Brit. Basid. 68, 1908—RICKEN, Blätterp. 405, 1915—REA, Brit. Basid. 341, 1922—BRES. Icon. Myc. V, pl. 217, 1928.

Agaricus (*Collybia*) *laceratus* LASCH, in FR. Epicr. Myc. 97, 1838; Hymen. Eur. 127, 1874—BERK. Outl. Brit. Fung. 120, 1860—CKE. Handb. Brit. Fung. I, 62, 1871; Handb. Austr. Fung. 21, 1892.

?*Agaricus familia* PK. 23 Ann. Rep. N. Y. State Cab. 79, 1872.

?*Agaricus oculus* PK. Ibid. 84, 1872.

?*Agaricus abundans* PK. 29 Ann. Rep. N. Y. State Mus. 38, 1878.

?*Collybia familia* SACC. Syll. Fung. V, 241, 1887—KAUFFM. Agar. Mich. 757, pl. 163, 1918.

?*Collybia abundans* SACC. Syll. Fung. V, 241, 1887—KAUFFM. Agar. Mich. 764, pl. 166, 1918.

?*Omphalia oculus* SACC. Syll. Fung. V, 336, 1887.

?*Gymnopus familia* MURRILL, North Amer. Fl. IX, 365, 1916.

?*Gymnopus oculus* MURRILL, Ibid. 367, 1916.

Caespitose or densely gregarious, edible. Pileus 2–5 cm. broad, convex, then plane, depressed at the center; surface smoky-gray, light-smoky-gray or avellaneous, usually darker at the center, innate-fibrillose, often splitting or striate or fimbriately torn at the margin, somewhat moist; context thin, grayish white; lamellae adnate, subcrowded, rather narrow, often veiny, white or grayish-white; stipe 3–8 cm. long, 3–5 mm. thick, subequal or slightly attenuated upward, subconcolorous or paler than the pileus, subglabrous or fibrillosely striate, but floccose-pruinose at the apex and white tomentose at the base, often curved and contorted, easily splitting, hollow; spores white in mass, globose, or subglobose, 4–5 μ.

Hab. on decaying wood, especially on coniferous wood in woods. Ishikari (Nopporo, Jôzankei, Mt. Kurodake), Kushiro (Lake side of Akan), Kitami (Oketo forest).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America?, Australia.

Jap. name. *Hime-hirohidatake* (n. n.).

FRIES described the lamellae of this fungus as "distantibus", and many other authors have also ascribed distant lamellae to this fungus. But BRESADOLA has described them "subconfertae", RICKEN "fast gedrängt" and REA "somewhat crowded or distant". The specimens at hand have subcrowded lamellae. To judge from the descriptions PECK's fungi cited above probably belong here.

4. *Collybia maculata* (ALB. et SCHW. ex FR.) QUÉL.

Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 341, 1873; Ench. Fung. 28, 1886—GILL. Hymen. Fr. 315, cum icone, 1874—KARST. Hattsv. I, 144, 1879—SACC. Syll. Fung. V, 207, 1887; Fl. Ital. Crypt., Hymen. 233, 1915—MASS. Brit. Fung. Fl. III, 123, 1893—W. G. SM. Brit. Basid. 60, 1908 RICKEN, Blätterp. 410, pl. 107, f. 3, 1915—KAUFFM. Agar. Mich. 768, 1918—REA, Brit. Basid. 330, 1922—BRES. Icon. Myc. IV, pl. 194, 1928.

Agaricus carnosus CURT. Fl. Lond. Fasc. 5, pl. 71, 1777–1787—SOW. Engl. Fung. pl. 246, 1803 (teste FR.).

Agaricus maculatus ALB. et SCHW. Consp. Fung. Lus. 186, 1805 (teste FR.).

Agaricus (Tricholoma) maculatus FR. Syst. Myc. I, 45, 1821.

Agaricus (Collybia) maculatus FR. Epicr. Myc. 84, 1838; Hymen. Eur. 112, 1874—BERK. Outl. Brit. Fung. 115, 1860—KICKX, Fl. Crypt. Flandr. II, 147, 1867—CKE. Handb. Brit. Fung. I, 55, 1871; Ill. Brit. Fung. pl. 142, 1883—WINT. Die Pilze, I, 781, 1884—SCHROET. Pilze Schles. I, 647, 1889.

Gymnopus carnosus MURRILL, North Amer. Fl. IX, 358, 1916.

Gregarious, edible. Pileus 5–10 cm. broad, convex, then expanded to nearly plane; surface white or whitish, then spotted or stained with reddish color, usually becoming wholly yellowish, brownish or rufescent when matured, smooth, glabrous, margin thin involute at first; context white, thick, firm, with farinaceous odour and mild taste; lamellae adnexed or emarginate-free, white, whitish or yellowish, often spotted with reddish color, narrow, very crowded, denticulate on the edge; stipe 6–12 cm. long, 6–15 mm. thick, somewhat equal or slightly attenuated upward and downward from the portion at ground level, praemorsely radicate, often curved at the base, white, spotted with reddish color, striate, often contorted, stout, firm, cartilaginous, hollow; spores white or pale flesh color in mass, subglobose, sometimes slightly apiculate at one end, 4–6 μ.

Hab. on the ground or on much decayed wood in woods. Autumn. Ishikari (Nopporo), Iburi (Lake side of Shikotsu), Tokachi (Lake side of Shikaribetsu).

Distr. Japan (Hokkaido, Honshu), Siberia, Asia Minor, Europe, North America.

Jap. name. *Aka-aza-take* (n. n.).

5. *Collybia butyracea* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 93, 1872; Ench. Fung. 28, 1886—GILL. Hymen. Fr. 316, 1874—KARST. Hattsv. I, 144, 1879—SACC. Syll. Fung. V, 209, 1887; Fl. Ital. Crypt., Hymen. 233, 1915—MASS. Brit. Fung. Fl. III, 125, 1893—W. G. SM. Brit. Basid. 61, 1908—ROLLAND, Atlas

Champ. 47, f. 99, 1910—RICKEN, Blätterp. 408, pl. 107, f. 2, 1915—KAUFFM. Agar. Mich. 753, 1918—REA, Brit. Basid. 331, 1922—BRES. Icon. Myc. IV, pl. 200, 1928.

Agaricus butyraceus BULL. Champ. Fr. pl. 572, 1791 (teste FR.).

Agaricus (*Clitocybe*) *butyraceus* FR. Syst. Myc. I, 121, 1821—BERK. in SMITH, Engl. Fl. V, (2), 46, 1836.

Agaricus (*Collybia*) *butyraceus* FR. Epicr. Myc. 84, 1838; Hymen. Eur. 113, 1874—BERK. Outl. Brit. Fung. 115, 1860—KICKX, Fl. Crypt. Flandr. II, 147, 1867—CKE. Handb. Brit. Fung. I, 55, 1871; Ill. Brit. Fung. pl. 143, 1883; Handb. Austr. Fung. 18, 1892—WINT. Die Pilze, I, 780, 1884—SCHROET. Pilze Schles. I, 646, 1889.

[YASUDA, Bot. Mag. (Tokyo), XXIII, (402), 1909]

Gregarious or solitary, edible. Pileus 3–6 cm. broad, convex, then nearly plane or umbonate, sometimes with irregularly elevated margin, obtuse; surface glabrous, subhygrophanous, varying in color, commonly some shade of bay-red or tan-color (bay-brown-rufous, then becoming yellowish, ochraceous or whitish); context thin, white, slightly fleshy, tough, taste and odour none; lamellae adnexed or almost free, white or whitish, narrow, crowded; stipe 2–8 cm. long, 4–8 mm. thick, attenuated upward, enlarged at the base, sometimes subbulbous at the base, up to 2 cm. thick, glabrous, yellowish, brownish or rufescent, commonly concolorous, striate, cartilaginous, hollow; spores white in mass, ellipsoidal, 6–9 × 3.5–4.5 μ.

Hab. on the ground in woods, especially under conifers. Autumn. Ishikari (Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Siberia, Europe, North America, Africa.

Jap. name. *Ese-orimiki* (n. n.), *Orimiki* (YASUDA).

Sect. Vestipedes FR.

Epicr. Myc. 86, 1838.

Stipe slender, equal, fistulose or medullate, even, velvety, floccose or pruinose.

6. *Collybia velutipes* (CURT. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 94, 1872—GILL. Hymen. Fr. 318, cum icone, 1874—KARST. Hattsv. I, 147, 1879—SACC. Syll. Fung. V, 212, 1887; Fl. Ital. Crypt., Hymen. 235, 1915—MASS. Brit. Fung. Fl. III, 127, 1893—ATKINS. Mushrooms, ed. 2, 92, f. 95, 1903—W. G. SM. Brit. Basid. 62, 1908—ROLLAND, Atlas Champ. 48, f. 103, 1910—KAWAMURA, Ill. Jap. Fung. pl. 10, f. 5–6, 1914—RICKEN, Blätterp. 415, pl. 108, f. 5, 1915—KAUFFM.

Agar. Mich. 769, pl. 168, 1918—REA, Brit. Basid. 332, 1922—BRES. Icon. Myc. V, pl. 201, 1928.

[P. HENN. ENGLERS Bot. Jarb. XXXII, 41, 1903—MATSUM. Ind. Pl. Jap. I, 137, 1904—UMEMURA, Bot. Mag. (Tokyo), XXVIII, (358), 1914; Pl. Fujiyama. 366, 1923—YASUDA, Bot. Mag. (Tokyo), XXXV, (270), 1921—MATSUU. & KANADA, Trans. Tottori Soc. Agr. Sci. III, 117, 1931]

Agaricus velutipes CURT. Fl. Lond. pl. 70, 1778 (teste FR.)—SOW. Engl. Fung. pl. 384, f. 3, 1803.

Agaricus nigripes BULL. Champ. Fr. pl. 344, 1791 (teste FR.).

Agaricus (Clitocybe) velutipes FR. Syst. Myc. I, 119, 1821—BERK. in SMITH, Engl. Fl. V, (2), 44, 1836.

Agaricus (Collybia) velutipes FR. Epicr. Myc. 86, 1838; Hymen. Eur. 115, 1874—BERK. Outl. Brit. Fung. 116, 1860—KICKX, Fl. Crypt. Flandr. II, 148, 1867—CKE. Handb. Brit. Fung. I, 55, 1871; Ill. Brit. Fung. pl. 184, f. A, 1883; Handb. Austr. Fung. 19, 1892—WINT. Die Pilze, I, 779, 1884—SCHROET. Pilze Schles. I, 646, 1889.

Pleurotus velutipes QUÉL. Ench. Fung. 147, 1886.

Gymnopus velutipes MURRILL, North Amer. Fl. IX, 361, 1916.

Caespitose, gregarious or rarely solitary, edible. Pileus 2.5–10 cm. broad, convex, then plane; surface smooth, viscid when wet, fulvous, tawny, rarely ochraceous-orange or orange to cream or cream-buff, margin paler, slightly incurved at first, later upturned or wavy and slightly striate; context whitish or yellowish, rather thick at the center, watery, soft, taste mild, odour agreeable; lamellae whitish or yellowish, adnexed or sinuate-adnexed, broader and rounded behind, rather distant; stipe 3.5–12 cm. long, 3–15 mm. thick, equal or slightly attenuated upward, lemon-yellow, then umber to bister, lighter colored or yellowish above, with dense velvety hairs, especially at the base, cartilaginous, tough, hollow or nearly stuffed; spores white in mass, ellipsoidal, hyaline, smooth, $6.5–7.5 \times 3.5–4\,\mu$.

Hab. on rotting wood and at the base of trunks of various frondose trees. Nearly all seasons. Oshima (Ônomura), Iburi (Tomakomai, Chitose, Lake side of Shikotsu), Ishikari (Sapporo, Nopporo), Tokachi (Lake side of Shikaribetsu), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), China, Siberia, Asia Minor, Europe, North America, Africa, Australia.

Jap. name. *Enoki-take* (KAWAMURA).

Sect. Laevipedes FR.

Epicr. Myc. 90, 1838.

Stipe slender, equal, fistulose, naked, glabrous (except the base), not conspicuously striate.

7. *Collybia esculenta* (WULF. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 97, 1872—GILL. Hymen. Fr. 325, 1874—KARST. Hattsv. I, 154, 1879—SACC. Syll. Fung. V, 227, 1887; Fl. Ital. Crypt., Hymen. 221, 1915—MASS. Brit. Fung. Fl. III, 138, 1893—W. G. SM. Brit. Basid. 65, 1908—RICKEN, Blätterp. 414, pl. 109, f. 1, 1915—BRES. Icon. Myc. V, pl. 210, f. 1, 1928.

Agaricus esculentus WULF. in JACQ. Miscell. II, 103, pl. 14, f. 4, 1778 (teste FR.)—PERS. Syn. Fung. 388, 1801.

Agaricus tenacellus PERS. Obs. Myc. I, 50, 1796; Syn. Fung. 387, 1801; Myc. Eur. III, 152, 1828.

[YASUDA, Bot. Mag. (Tokyo), XXVIII, (30), 1914—NAKAJI, Bot. Mag. (Tokyo), XXX, (102), 1916]

Agaricus (Collybia) esculentus FR. Syst. Myc. I, 131, 1821; Epicr. Myc. 92, 1838; Hymen. Eur. 121, 1874—BERK. in SMITH, Engl. Fl. V, (2), 50, 1836; Outl. Brit. Fung. 118, 1860—CKE. Handb. Brit. Fung. I, 60, 1871; Ill. Brit. Fung. pl. 152, f. A, 1883—WINT. Die Pilze, I, 774, 1884—SCHROET. Pilze Schles. I, 644, 1889.

Agaricus (Collybia) tenacellus FR. Syst. Myc. I, 131, 1821; Epicr. Myc. 92, 1838; Hymen. Eur. 121, 1874—SCHROET. Pilze Schles. I, 643, 1889.

Agaricus clavus PERS. Myc. Eur. III, 150, 1828.

Agaricus stolonifer JUNGH. Linnaea, V, 396, 1830—FR. Epicr. Myc. 92, 1838.

Collybia tenacellus QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 97, 1872—GILL. Hymen. Fr. 325, cum icone, 1874—SACC. Syll. Fung. V, 227, 1887; Fl. Ital. Crypt., Hymen. 223, 1915—MASS. Brit. Fung. Fl. III, 139, 1893—W. G. SM. Brit. Basid. 65, 1908—KONRAD, Bull. Soc. Myc. Fr. XLVII, 129, 1931; KONRAD & MAUBL. Icon. Sel. Fung. III, pl. 206, 1932.

Collybia tenacellus var. *stolonifer* QUÉL. Ibid. V, 97, 1872—GILL. Hymen. Fr. 325, 1874.

Agaricus plumipes KALCHBR. Icon. Hymen. Hung. I, 15, pl. 6, f. 3, 1873—FR. Hymen. Eur. 121, 1874.

Agaricus (Collybia) tenacellus var. *stolonifer* FR. Hymen. Eur. 121, 1874—CKE. Handb. Brit. Fung. ed. 2, I, 70, 1883; Ill. Brit. Fung. pl. 152, f. B, 1883.

Collybia clavus QUÉL. Ench. Fung. 30, 1886.

Collybia stolonifera SACC. Syll. Fung. V, 228, 1887; Fl. Ital. Crypt., Hymen. 222, 1915.

Collybia plumipes SACC. Ibid. V, 228, 1887.

?*Marasmius conigenus* KARST. Finl. Basidsv. 102, 1889—REA, Brit. Basid. 521, 1922.

Marasmius esculentus KARST. Finl. Basidsv. 103, 1889—REA, Brit. Basid. 521, 1922.

Marasmius esculentus var. *tenacellus* KARST. Ibid. 103, 1889.

Marasmius esculentus var. *stolonifer* KARST. Ibid. 103, 1889.

Collybia conigena BRES. Fung. Trid. II, 86, pl. 198, f. 2, 1900; Icon. Myc. V, pl. 210, f. 2, 1928—RICKEN, Blätterp. 413, pl. 109, f. 3, 1915—BREBIN, Bull. Soc. Myc. Fr. XLII, 125, 1926.

[KAWAMURA, Jap. Fung. no. 8, 1929]

Solitary, gregarious or subcaespitose, edible. Pileus 1–2.5 cm. broad, at first conico-campanulate or convex, then plane or subumbonate; surface glabrous, variable in color, whitish, ochraceous to fuscous, usually darker at the center; context white, very thin on the margin, taste and odour almost none; lamellae sinuato-adnexed or rounded-adnexed, white, then discolored, crowded; stipe 2–6 cm. or more long, 2–3 mm. thick, equal, whitish, ochraceous to clay color or subconcolorous, white-pruinose above, base long-rooted and tomentosely fibrillose; spores white in mass, ellipsoidal, $5–7.5 \times 3–4.5\ \mu$; cystidia ventricosely fusiform or obovately clavate, capitately thickened or pointed at the apices, thick-walled.

Hab. on buried cones of conifers in woods. Late-spring to summer (or to autumn?). Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Australia.

Jap. name. *Matsukasa-shimeji* (YASUDA), *Matsukasa-tsuetake* (KAWAMURA).

8. *Collybia acervata* (FR.) GILL.

Hymen. Fr. 329, cum icone, 1874—KARST. Hattsv. I, 154, 1879—SACC. Syll. Fung. V, 234, 1887; Fl. Ital. Crypt., Hymen. 225, 1915—MASS. Brit. Fung. Fl. III, 140, 1893—W. G. SM. Brit. Basid. 65, 1908—RICKEN, Blätterp. 412, 1915—KAUFFM. Agar. Mich. 759, 1918—REA, Brit. Basid. 337, 1922—BRES. Icon. Myc. V, pl. 211, 1928.

Agaricus (Clitocybe) acervatus FR. Syst. Myc. I, 122, 1821.

Agaricus (Collybia) acervatus FR. Epicr. Myc. 92, 1838; Hymen. Eur. 122, 1874—BERK. Outl. Brit. Fung. 119, 1860—CKE. Handb. Brit. Fung. I, 58, 1871; Ill. Brit. Fung. pl. 267, 1883—WINT. Die Pilze, I, 773, 1884—SCHROET. Pilze Schles. I, 643, 1889.

Collybia erythropus var. *acervata* QUÉL. Ench. Fung. 31, 1886.

Gymnopus acervatus MURRILL, North Amer. Fl. IX, 362, 1916.

Densely caespitose, edible. Pileus 2–6 cm. broad, convex, then plane, obtuse; surface pinkish-cinnamon to vinaceous-tawny when wet, paler or whitish when dry, glabrous, hygrophanous, margin involute at first, then flattened and scarcely striatulate when wet; con-

text thin, pallid, reddish in the stipe; lamellae adnexed or free, whitish or tinged with flesh-color, narrow, linear, plane, very crowded; stipe 4–8 cm. long, 2–5 mm. thick, subequal or slightly attenuated upward, rarely compressed, slender, rigid, glabrous, smooth, reddish, reddish-brown, often whitish at the apex, especially when young, commonly with a white mycelial tomentum at the base, hollow; spores white in mass, ellipsoidal, 6–8 × 2.5–4 μ.

Hab. on the ground among fallen leaves or on decaying wood in woods. Autumn. Ishikari (Nopporo), Tokachi (Lake side of Shikaribetsu).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Kabu-beni-cha* (n. n.).

Mycena (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 61 & 102, 1872.

Prunulus S. F. GRAY, Nat. Arr. Brit. Pl. I, 630, 1821—EARLE, Bull. N. Y. Bot. Gard. V, 427, 1909—MURRILL, North Amer. Fl. IX, 319, 1916.

Agaricus § *Mycena* FR. Syst. Myc. I, 140, 1821; Epicr. Myc. 99, 1838; Hymen. Eur. 129, 1874.

Mycenula KARST. Medd. Soc. Faun. Fl. Fenn. XVI, 89, 1889.

Insitica EARLE, Bull. N. Y. Bot. Gard. V, 425, 1909.

Basidopus EARLE, *Ibid. V, 426, 1909.*

Collopus EARLE, Ibid. V, 426, 1909.

Galactopus EARLE, Ibid. 426, 1909—MURRILL, North Amer. Fl. IX, 318, 1916.

Stereopodium EARLE, Ibid. V, 426, 1909.

Linopodium EARLE, Ibid. V, 427, 1909.

Fructification without volva and annulus. Pileus fleshy or membranous, regular, margin straight, never incurved. Stipe central, cartilaginous, usually slender. Lamellae adnate, adnexed or sinuato-adnate with a decurrent tooth, white or rarely bright colored, sometimes changing to gray or reddish. Spores white in mass.

Type species: *Agaricus galericulatus* SCOP. ex FR.

Key to the sections and species in Hokkaido.

I. Stipe juiceless, not dilated into a disc at the base.

A. Lamellae unicolorous, not changing color; Pileus pure colored, bright, not fuscous, nor cinereous........................ Sect. Adonideae.

1. Pileus rose-red, rose-purple, violet, lilac or whitish.... *M. pura*(1).

B. Lamellae changing color, from white to gray or reddish, commonly at length connected by veins; pileus not hygrophanous; generally lignicolous and caespitose; stipe strigose and rooted at the base.......... .... Sect. Rigidipedes.

1. Pileus pale grayish to grayish-brown, long striate; stipe smooth... .... *M. galericulata*(2).

2. Pileus drab, grayish or whitish, striate; stipe longitudinally striate. .... *M. polygramma*(3).

C. Lamellae changing color, paler at the edges, distant; pileus not hygrophanous, fuscous or rarely orange; stipe filiform, flaccid, rooting, dry; solitary, terrestrial or muscigenous................................ .... Sect. Filipedes.

1. Pileus orange or vermilion....................... *M. acicula*(4).

D. Lamellae changing color, at length decurrent with a tooth; pileus and stipe glutinous or viscid......................... Sect. Glutinipedes.

1. Pileus whitish or grayish.

a. Lamellae white, usually not becoming reddish in age.......... .... *M. epipterygia*(5).

b. Lamellae white, then becoming flesh-colored or spotted with reddish-brown............................ *M. viscosa*(6).

2. Pileus yellow................................ *M. citrinella*(7).

II. Stipe and lamellae exuding a milky, usually colored juice when broken.... .... Sect. Lactipedes.

A. Juice blood-red colored......................... *M. haematopus*(8).

B. Juice orange-chrome colored....................... *M. crocata*(9).

Sect. Adonideae Fr.

Epicr. Myc. 101, 1838; Hymen. Eur. 133, 1874.

Stipe juiceless, base not dilated into a disc; lamellae unicolorous, not changing color; pileus pure-colored, bright, not becoming fuscous, not cinereous; fructification simple, terrestrial.

1. *Mycena pura* (Pers. ex Fr.) Quél.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 103, 1872; Ench. Fung. 34, 1886—Gill. Hymen. Fr. 282, *cum icone*, 1874—Karst. Hattsv. I, 100, 1879—Sacc. Syll. Fung. V, 256, 1887; Fl. Ital. Crypt., Hymen. 259, 1915—Mass. Brit. Fung. Fl. III, 113, 1893—Atkins. Mushrooms, ed. 2, 95, f. 97, 1903—W. G. Sm. Brit. Basid. 72, 1908—Rolland, Atlas Champ. 52, f. 113, 1910—Ricken, Blätterp. 432, pl. 110, f. 2, 1915—Kauffm. Agar. Mich. 794, 1918—Rea, Brit. Basid. 377, 1922—Bres. Icon. Myc. V, pl. 226, 1928.

Agaricus roseus BULL. Champ. Fr. pl. 507, 1791 (teste FR.)—SOW. Engl. Fung. pl. 72, 1797—SCHROET. Pilze Schles. I, 637, 1889.

Agaricus purus PERS. Tent. Disp. Fung. 21, 1797; Syn. Fung. 339, 1801 (teste FR.).

Agaricus (Mycena) purus FR. Syst. Myc. I, 151, 1821; Epicr. Myc. 102, 1838; Hymen Eur. 133, 1874—BERK. in SMITH, Engl. Fl. V, (2), 60, 1836; Outl. Brit. Fung. 122, 1860—KICKX, Fl. Crypt. Flandr. II, 152, 1867—CKE. Handb. Brit. Fung. I, 65, 1871; Ill. Brit. Fung. pl. 157, 1883; Handb. Austr. Fung. 22, 1892—WINT. Die Pilze, I, 765, 1884.

Prunulus purus MURRILL, North Amer. Fl. IX, 332, 1916.

Solitary or gregarious, edible. Pileus 2–5 cm. or more broad, campanulate or convex, then expanded, at length nearly plane or umbonate; surface smooth, glabrous, varying in color, rosy-red, rose-purple, violet, lilac, or whitish, margin striatulate and finally sometimes upturned; context thin, white, odour somewhat of radish; lamellae adnate or sinuate, sometimes wavy and crenate on the edge, venoso-connected, rather broad, subdistant to crowded, varying from white to shades of rose or violet, sometimes white on edges; stipe 5–8 cm. or more long, 2–7 mm. thick, equal or slightly attenuated upward when large, often compressed and twisted, smooth, polished, sometimes silky flocculose, concolorous or darker or paler, somewhat villous at the base, firm, hollow; spores white in mass, ellipsoidal-oblong, $6–8 \times 3–4\,\mu$.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo, Sapporo, Mt. Kurodake), Oshima (Ônomura), Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America, Australia, Africa.

Jap. name. *Sakura-take* (n. n.).

Sect. Rigidipedes FR.

Epicr. Myc. 104, 1838; Hymen. Eur. 136, 1874.

Stipe firm, rigid, somewhat tough, juiceless, somewhat strigose and rooted at the base; lamellae changing color, from white to gray or reddish, commonly at length connected by veins; pileus not hygrophanous; generally lignicolous and caespitose.

2. *Mycena galericulata* (SCOP. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 104, 1872; Ench. Fung. 36, 1886—GILL. Hymen. Fr. 276, cum icone, 1874—KARST. Hattsv. I, 106, 1879—SACC. Syll. Fung. V, 268, 1887; Fl. Ital. Crypt. Hymen. 274, 1915—MASS. Brit. Fung. Fl. III, 107, 1893—ATKINS. Mushrooms, ed. 2, 94, 1903—W. G. SM. Brit. Basid. 75, 1908—ROLLAND, Atlas Champ. 51, f. 112, 1910 —RICKEN, Blätterp. 439, pl. 111, f. 1, 1915—KAUFFM. Agar. Mich. 797, 1918—REA, Brit. Basid. 383, 1922—BRES. Icon. Myc. V, pl. 234, 1928.

Agaricus galericulatus SCOP. Fl. Carn. ed. 2, II, 455, 1772 (teste FR.).

Agaricus (*Mycena*) *galericulatus* FR. Syst. Myc. I, 143, 1821; Epicr. Myc. 106, 1838; Hymen. Eur. 138, 1874—BERK. in SMITH, Engl. Fl. V, (2), 58, 1836; Outl. Brit. Fung. 124, 1860—KICKX, Fl. Crypt. Flandr. II, 153, 1867—CKE. Handb. Brit. Fung. I, 67, 1871; Ill. Brit. Fung. pl. 222, 1883; Handb. Austr. Fung. 23, 1892—WINT. Die Pilze, I, 761, 1884—SCHROET. Pilze Schles. I, 641, 1889.

Prunulus galericulatus MURRILL, North Amer. Fl. IX, 336, 1916.

Gregarious or caespitose. Pileus 2–5 cm. broad, conico-campanulate, then expanded, umbonate; surface dry, glabrous, pale grayish to grayish-brown, often with brown or blackish-ferruginous stains, usually darker when young, ashy white when old or dried, striate to the umbo; context whitish, thin, tough, odour and taste none; lamellae adnate or decurrent with a tooth, subdistant, moderately broad, connected by veins, dull-white or whitish, usually tinged with fleshy color in age, often stained when old, edge entire or crenulate-eroded; stipe 4–10 cm. or more long, 2–5 mm. thick, fistulose, glabrous, polished, often fusiform-rooted and white tomentose at the base, concolorous, often becoming yellowish or brownish, sometimes twisted or curved; spores white in mass, broadly ellipsoidal, 8–11 × 6–8 μ.

Hab. on rotten wood, old logs, stumps, etc. in woods, rarely on ground in woods. Summer to autumn. Ishikari (Nopporo, Mt. Kurodake), Kushiro (Mt. Meakan), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America, Africa, Australia.

Jap. name. *Ô-ashinaga-take* (n. n.).

3. *Mycena polygramma* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 104, 1872; Ench. Fung. 36, 1886—GILL. Hymen. Fr. 272, 1874—KARST. Hattsv. I, 106, 1879 —SACC. Syll. Fung. V, 269, 1887; Fl. Ital. Crypt., Hymen. 269, 1915—MASS. Brit. Fung. Fl. III, 108, 1893—ATKINS. Mushrooms, ed. 2, 94, f. 96, 1903—W.

G. SM. Brit. Basid. 75, 1908—RICKEN, Blätterp. 438, pl. 111, f. 7, 1915—KAUFFM. Agar. Mich. 801, 1918—REA, Brit. Basid. 384, 1922—BRES. Icon. Myc. V, 237, 1928.

[KAWAMURA, Jap. Fung. no. 89, 1929]

Agaricus polygrammus BULL. Champ. Fr. pl. 395, 1791 (teste FR.)—SOW. Engl. Fung. pl. 222, 1799—PERS. Syn. Fung. 377, 1801.

Agaricus (*Mycena*) *polygrammus* FR. Syst. Myc. I, 146, 1821; Epicr. Myc. 107, 1838; Hymen. Eur. 139, 1874—BERK. in SMITH, Engl. Fl. V, (2), 58, 1836; Outl. Brit. Fung. 124, 1860—KICKX, Fl. Crypt. Flandr. II, 153, 1867—CKE. Handb. Brit. Fung. I, 68, 1871; Ill. Brit. Fung. pl. 223, f. B, 1883—WINT. Die Pilze, I, 761, 1884—SCHROET. Pilze Schles. I, 641, 1889.

Gregarious, caespitose or solitary. Pileus 2–5 cm. broad, campanulate or conico-campanulate, subumbonate; surface dry, drab, grayish or whitish, glabrous, rarely pruinose, striate, margin white when young, sulcate-striate and often toothed; context white, thin; lamellae narrowly adnate or nearly free, not uncinate, ascending or arcuate, broader in the middle, subdistant, white with a faint flush of pink, edge even; stipe 5–10 cm. long, 2–4 mm. thick, equal or slightly attenuated upward, concolorous, longitudinally striate throughout or at the apex, sometimes twisted, straight or flexuous, cartilaginous, firm and rigid but fragile, glabrous, shining, strigose-rooted at the base, hollow; spores white in mass, broadly ellipsoidal, $8–10 \times 6–8\ \mu$, smooth; cystidia fusiform-acuminate or flask-shaped with a prolonged apex.

Hab. on decaying logs or wood in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Siberia, Europe, North America, Asia Minor.

Jap. name. *Ashi-naga-take* (KAWAMURA).

Sect. Filipedes FR.

Epicr. Myc. 111, 1838; Hymen. Eur. 144, 1874.

Stipe filiform, scarcely 2 mm. thick (and not more), flaccid, somewhat tough, rooting, dry, juiceless, commonly very long in proportion to the pileus; lamellae changing color, paler at the edge, distant; fructification very slender, tense and straight, terrestrial, muscigenous, inodorous, solitary (not caespitose); pileus fuscous or rarely orange, becoming somewhat pale, not hygrophanous.

4. *Mycena acicula* (SCHAEFF. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 107, 1872; Ench. Fung. 39, 1886—GILL. Hymen. Fr. 277, 1874—KARST. Hattsv. I, 117, 1879—SACC. Syll. Fung. V, 288, 1887—MASS. Brit. Fung. Fl. III, 90, 1893—ATKINS. Mushrooms, ed. 2, 97, f. 100, 1903—W. G. SM. Brit. Basid. 79, 1908—RICKEN, Blätterp. 431, pl. 109, f. 7, 1915—KAUFFM. Agar. Mich. 812, 1918—REA, Brit. Basid. 393, 1922.

Agaricus coccineus SCOP. Fl. Carn. ed. 2, II, 436, 1772 (teste FR.).

Agaricus aciculus SCHAEFF. Fung. Bavar. IV, Ind. 52, pl. 222, 1774.

Agaricus (*Mycena*) *aciculus* FR. Epricr. Myc. 114, 1838; Hymen. Eur. 147, 1874—BERK. Outl. Brit. Fung. 127, 1860—KICKX, Fl. Crypt. Flandr. II, 155, 1867—CKE. Handb. Brit. Fung. I, 71, 1871—WINT. Die Pilze, I, 754, 1884—SCHROET. Pilze Schles. I, 633, 1889.

Mycena coccinea SACC. Fl. Ital. Crypt., Hymen. 276, 1915.

Solitary or scattered. Pileus 2–6 mm. broad, campanulate, then convex, sometimes papillate; surface glabrous, glaucous, striatulate on the margin, vermilion, reddish-orange or yellowish with red center; context very thin, membranous, reddish; lamellae rounded-adnexed or almost free, yellow, yellowish, creamy-white or white, rather broad, ventricose, subdistant to distant, the alternate ones shorter, edge minutely crenulate; stipe 2–5 cm. long, about 1 mm. thick, filiform, equal, more or less rooting, glabrous or minutely pulverulent at first especially at the apex, shining, bright yellow, becoming pale, villous at the base, hollow; spores white in mass, oblong-fusiform, smooth, 8–11 × 2–4 μ.

Hab. on rotten wood, or among fallen leaves and grass in woods, meadows etc. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), China, Europe, North America.

Jap. name. *Beni-kanoashi-take* (n. n.).

Sect. **Glutinipedes** FR.

Epicr. Myc. 116, 1838; Hymen. Eur. 149, 1874.

Stipe juiceless, glutinous or viscid; lamellae at length decurrent with a tooth.

5. *Mycena epipterygia* (SCOP. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 108, 1872, p. p.—R. MAIRE, Bull. Soc. Myc. Fr. XXVI, 161, f. 1A, 1910—RICKEN, Blätterp. 419, pl. 109, f. 12, 1915—REA, Brit. Basid. 396, 1922.

Agaricus epipterygius SCOP. Fl. Carn. ed. 2, II, 455, 1772—PERS. Syn. Fung. 382, 1801 (excl. var. γ).
Agaricus nutans SOW. Engl. Fung. pl. 92, 1797.
Prunulus epipterygius MURRILL, North Amer. Fl. IX, 335, 1916.
Agaricus (Mycena) epipterygius Auct. plur. p. p.
Mycena epipterygia Auct. plur. p. p.

Gregarious or caespitose. Pileus 1–3 cm. broad, conico-ovate, then campanulate or subhemispherical, at length subumbonate; surface hygrophanous, covered with a viscid separable pellicle, at first whitish, grayish or yellow, becoming whitish when dried, striate, margin often denticulate; context white, not changing to reddish in age, very thin; taste and odour almost none; lamellae adnate with a decurrent tooth, straight or slightly arcuate, subdistant, rather broad, white at first, grayish in age, edge almost entire; stipe 5–10 cm. long, 1–2 mm. thick, fistulose, equal, straight or flexuous, sometimes twisted or compressed, rooted, glabrous, viscid, citron-yellow or pale citron-color, sometimes cinereous, pallid or whitish, white fibrillose at the base; spores white in mass, ellipsoidal, smooth, 8–11 × 4–5 μ; cystidia none.

Hab. on the ground among fallen leaves in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America, Asia Minor, Siberia, Australia.

Jap. name. *Name-ashi-take* (n. n.).

6. *Mycena viscosa* (SECR.) R. MAIRE

Bull. Soc. Myc. Fr. XXVI, 162, f. 1B, 1910—RICKEN, Blätterp. 419, 1915—REA, Brit. Basid. 396, 1922.
Agaricus (Mycena) epipterygius FR. Syst. Myc. I, 155, 1821, p. p.
Agaricus alcalinus var. *viscosus* SECR. Mycogr. Suisse, II, 312, 1833.
Agaricus epipterygius Auct. plur. p. p.
Mycena epipterygia Auct. plur. p. p.

Gregarious or caespitose. Pileus 1–3 cm. broad, conical or campanulate, then expanded; surface hygrophanous, whitish, grayish, then drab, finally reddish-brown, especially darker at the center, long remaining whitish at the margin, long striate, covered with a easily separable viscid pellicle; context whitish, becoming reddish-brown with age, thin, membranous, odour farinaceous; lamellae adnate, with a decurrent tooth, then grayish or flesh color, rarely spotted with reddish-brown, subdistant to subcrowded; stipe 4–10 cm. long,

1–3 mm. thick, equal, citron-yellow, sulphur yellow or golden yellow, viscid, white fibrillose at the base, hollow; spores white in mass, broadly ellipsoidal, smooth, 8–10 × 6–8 μ; cystidia numerous, capitate, 45–55 × 16–18 μ.

Hab. on or around rotten stumps of coniferous wood or among fallen leaves in woods. Autumn. Ishikari (Nopporo, Jôzankei, Mt. Kurodake), Kushiro (Mt. Meakan), Kitami (Oketo forest).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Akaha-nameashitake* (n. n.).

7. *Mycena citrinella* (Pers. ex Fr.) Quél.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 108, 1872; Ench. Fung. 40, 1886—Gill. Hymen. Fr. 258, 1874—Karst. Hattsv. I, 120, 1879—Sacc. Syll. Fung. V, 296, 1887—Mass. Brit. Fung. Fl. III, 84, 1893—W. G. Sm. Brit. Basid. 80, 1908—Ricken, Blätterp. 419, 1915—Rea, Brit. Basid. 397, 1922.

Agaricus tenellus Batsch, Elench.Fung. Cont. I, 103, pl. 18, f. 88, 1786 (teste Fr.).

Agaricus citrinellus Pers. Icon. Desc. II, 44, pl. 11, f. 3, 1800; Syn. Fung. 384, 1801 (teste Fr.).

Agaricus (*Mycena*) *citrinellus* Fr. Syst. Myc. I, 155, 1821; Epicr. Myc. 116, 1838; Hymen. Eur. 150, 1874—Cke. Handb. Brit. Fung. I, 74, 1871—Wint. Die Pilze, I, 751, 1884—Schroet. Pilze Schles. I, 631, 1889.

Mycena tenella Sacc. Fl. Ital. Crypt., Hymen. 245, 1915.

Solitary or in small clusters. Pileus 5–15 mm. broad, campanulate or conical-campanulate, then expanded to hemispherical or convex; surface picric-yellow at first, then becoming paler and nearly whitish, viscid, striate on the margin; context white, thin; lamellae subdecurrent, white, distant, rather broad; stipe 4–9 cm. long, 0.8–1.2 mm. thick, subequal, fistulose, concolorous, viscid, white fibrillose at the base; spores white in mass, oblong or ellipsoidal, 7.5–10 × 4–5 μ.

Hab. on the ground among fallen leaves in woods. Summer to autumn. Ishikari (Nopporo, Mt. Teine, Mt. Kurodake), Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan), Tokachi (Lake side of Shikaribetsu), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Europe.

Jap. name. *Ki-nameashitake* (n. n.).

Sect. Lactipedes Fr.

Epicr. Myc. 114, 1838; Hymen. Eur. 148, 1874.

Stipe and lamellae exuding a milky, usually colored juice when broken; stipe dry, rooting.

8. *Mycena haematopus* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 244, 1872; Ench. Fung. 39, 1886—GILL. Hymen. Fr. 260, cum icone, 1874—KARST. Hattsv. I, 117, 1879—SACC. Syll. Fung. V, 291, 1887; Fl. Ital. Crypt., Hymen. 253, 1915—MASS. Brit. Fung. Fl. III, 90, 1893—ATKINS. Mushrooms, ed. 2, 98, f. 102, 1903—W. G. SM. Brit. Basid. 79, 1908—RICKEN, Blätterp. 421, 1915—KAUFFM. Agar. Mich. 783, 1918—REA, Brit. Basid. 394, 1922—BRES. Icon. Myc. V, pl. 247, f. 2, 1928.

[KAWAMURA, Jap. Fung. no. 60, 1929]

Agaricus haematopus PERS. Obs. Myc. II, 56, 1799; Syn. Fung. 379, 1801 (teste FR.).

Agaricus (*Mycena*) *haematopus* FR. Obs. Myc. I, 33, 1815; Syst. Myc. I, 149, 1821; Epicr. Myc. 114, 1838; Hymen. Eur. 148, 1874—CKE. Handb. Brit. Fung. I, 72, 1871; Ill. Brit. Fung. pl. 162, 1883; Handb. Austr. Fung. 24, 1892—WINT. Die Pilze, I, 754, 1884—SCHROET. Pilze Schles. I, 633, 1889.

Galactopus haematopus EARLE, Bull. N. Y. Bot. Gard. V, 426, 1909—MURRILL, North Amer. Fl. IX, 319, 1916.

Gregarious, subcaespitose or solitary, exuding blood-like juice from every wounded part. Pileus 1.5–4.5 cm. broad, conical, then campanulate; surface whitish to dark reddish color with a purplish tinge, smooth, dry, margin slightly striate and with denticulate veil; context subfleshy, thin, taste and odour none; lamellae white, then flesh color or vinaceous, adnate with a small decurrent tooth, subdistant; stipe 9–11 cm. long, 2–3 mm. thick, slightly attenuated upward, subconcolorous, smooth, but white-downy at the base, hollow, rigid, cartilaginous; spores white in mass, ellipsoidal, $9–11 \times 5.5–6.5\ \mu$.

Hab. on humus soil or much decayed wood in woods. Summer to autumn. Ishikari (Nopporo, Mt. Teine, Sapporo, Mt. Kurodake), Oshima (Ônomura), Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan, Mt. Meakan).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Australia.

Jap. name. *Chishio-take* (IMAI, KAWAMURA).

9. *Mycena crocata* (SCHRAD. ex FR.) GILL.

Hymen. Fr. 260, 1874—QUÉL. Champ. Jura Vosg. 3 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 435, 1875; Ench. Fung. 39, 1886—KARST. Hattsv. I, 118, 1879—SACC. Syll. Fung. V, 292, 1887—MASS. Brit. Fung. Fl. III, 88, 1893—W. G. SM. Brit. Basid. 79, 1908—RICKEN, Blätterp. 421, 1915—REA, Brit. Basid. 395, 1922.

Agaricus crocatus SCHRAD. Spic. Fl. Germ. 127, 1794 (teste FR.)—PERS. Syn. Fung. 380, 1801.

Agaricus (Mycena) crocatus FR. Syst. Myc. I, 148, 1821; Epicr. Myc. 115, 1838; Hymen. Eur. 148, 1874—BERK. Outl. Brit. Fung. 127, 1860—CKE. Handb. Brit. Fung. I, 73, 1871—WINT. Die Pilze, I, 753, 1884.

Gregarious or solitary, exuding orange-chrome or flame-scarlet colored juice from every wounded part. Pileus 2–4 cm. broad, conical, then campanulate, at length subumbonate; surface grayish, olive-buff, reddish, light-buckthorn-brown or clay colored, darker at the umbo, smooth, dry, long striate on the margin, margin very thin; context thin, whitish, soon flame-scarlet colored, taste mild, odour none; lamellae white, adnate or slightly decurrent by a tooth, rather distant, broader in front, subventricose; stipe 10–15 cm. long, 2–3.5 mm. thick, slightly attenuated upward, with rooted, creeping and woolly base, orange-buff or flame-scarlet, especially toward the base, cartilaginous, hollow; spores white in mass, ellipsoidal, 7.5–10.5 × 4.5–6 μ.

Hab. on humus soil or much decayed wood in woods. Autumn. Ishikari (Sapporo, Nopporo), Iburi (Ônomura).

Distr. Japan (Hokkaido, Honshu), Europe, Asia Minor.

Jap. name. *Aka-chishio-take* (n. n.).

Omphalia (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 61 & 99, 1872.

Agaricus § *Omphalia* PERS. Syn. Fung. 447, 1801, p. p.

Agaricus § *Omphalia* FR. Syst. Myc. I, 9 & 162, 1821; Epicr. Myc. 119, 1838.

Omphalina QUÉL. Ench. Fung. 42, 1886.

Delicatula FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 313, 1889.

Omphalopsis EARLE, Bull. N. Y. Bot. Gard. V, 425, 1909.

Fructification without volva and annulus. Pileus fleshy or membranous, regular, often umbilicate; margin incurved, or straight and

adpressed to the stipe. Stipe central, cartilaginous, usually slender. Lamellae decurrent. Spores white in mass.

Type species: *Agaricus hydrogrammus* BULL. ex FR.

Key to the sections and species in Hokkaido.

I. Pileus at first spread out, margin incurved............. Sect. Collybiariae.
  A. Fructification medium-sized; lamellae rather distant, narrow, attenuated at both ends; pileus cinereous-fuliginous and striate when moist, becoming pale, silky or floccosely-squamulose when dry; stipe cinereous.. .... *O. epichysium* (1).

II. Pileus at first campanulate, margin straight, adpressed to the stipe........ .... Sect. Mycenariae.
  A. Lamellae broad, perfect, unequal.
    1. Pileus yellow-ferruginous; stipe date brown, polished............ .... *O. campanella* (2).
    2. Pileus black-fuscous or umber-fuscous; stipe concolorous......... .... *O. umbratilis* (3).

Sect. Collybiariae FR.

Epicr. Myc. 120, 1838.

Pileus at first spread out, margin incurved.

Subsect. Pyxidati FR.

Ibid. 122, 1838.

Medium-sized; lamellae rather distant, narrow, attenuated at both ends.

1. *Omphalia epichysium* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 100, 1872 —KARST. Hattsv. I, 130, 1879—SACC. Syll. Fung. V, 314, 1887; Fl. Ital. Crypt., Hymen. 287, 1915—ATKINS. Mushrooms, ed. 2, 101, f. 104, 1903—W. G. SM. Brit. Basid. 85, 1908—RICKEN, Blätterp. 388, 1915—KAUFFM. Agar. Mich. 818, pl. 171, 1918—REA, Brit. Basid. 426, 1922—BRES. Icon. Myc. VI, pl. 261, 1928—CEJP, Rev. Cent. Eur. Sp. Omphalia-Mycena, II, 34, 1929.

[MATSUM. *Ind. Pl. Jap. I, 156, 1904*]

Agaricus (*Omphalia*) *epichysium* PERS. Syn. Fung. 462, 1801 (teste FR.).

Agaricus (*Omphalia*) *epichysium* FR. Syst. Myc. I, 169, 1821; Epicr. Myc. 123, 1838; Hymen. Eur. 158, 1874—WINT. Die Pilze, I, 746, 1884—SCHROET. Pilze Schles. I, 628, 1889—CKE. Handb. Austr. Fung. 27, 1892.

Omphalina epichysium QUÉL. Ench. Fung. 43, 1886.

Gregarious or solitary. Pileus 1–4 cm. broad, convex, then expanded to umbilicate or umbilicato-infundibuliform; surface dark-cinereous to smoky-brown, becoming paler when dry, center flocculoso-subsquamulose, then glabrous, margin striatulate when wet, often undulate-lobate; context subconcolorous, odour and taste none; lamellae subdecurrent or plano-decurrent, distant, whitish-cinereous; stipe 1.5–3 cm. long, 1.5–4 mm. thick, equal, smoky-cinereous, glabrous, base white floccose, almost solid or subfistulose; spores white in mass, ellipsoidal, smooth, 7.5–10 × 4–6 μ.

Hab. on rotten wood in woods. Autumn. Ishikari (Nopporo), Kitami (Oketo forest).

Distr. Japan (Hokkaido), China, Asia Minor, Europe, North America, Australia.

Jap. name. *Hida-sakazukitake* (n. n.).

Sect. **Mycenariae** FR.

Epicr. Myc. 126, 1838.

Pileus at first campanulate, margin straight, at first adpressed to the stipe.

Subsect. **Campanullae** FR.

Ibid. 126, 1838.

Lamellae broad, perfect, unequal.

2. *Omphalia campanella* (BATSCH ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 240, 1872—GILL. Hymen. Fr. 299, 1874—KARST. Hattsv. I, 135, 1879—SACC. Syll. Fung. V, 327, 1887—MASS. Brit. Fung. Fl. II, 397, 1893—ATKINS. Mushrooms, ed. 2, 101, f. 103, 1903—W. G. SM. Brit. Basid. 87, 1908—RICKEN, Blätterp. 397, 1915—KAUFFM. Agar. Mich. 823, pl. 172, 1918—REA, Brit. Basid. 431, 1922—BRES. Icon. Myc. VI, pl. 273, 1928—CEIJ, Rev. Cent. Eur. Sp. Omphalia-Mycena, II, 55, 1929—LANGE, Agar. Denm. VIII, 15, 1930.

[MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 117, 1931]

Agaricus fragilis SCHAEFF. Fung. Bavar. IV, Ind. 56, pl. 230, 1774 (teste FR.)—SCHROET. Pilze Schles. I, 627, 1889.

Agaricus campanella BATSCH, Elench. Fung. 74, 1783 (teste FR.).

Agaricus (Omphalia) campanella PERS. Syn. Fung. 469, 1801 (teste FR.).

Agaricus (Omphalia) campanella FR. Syst. Myc. I, 166, 1821; Epicr. Myc. 126, 1838; Hymen. Eur. 162, 1874—BERK. in SMITH, Engl. Fl. V, (2), 66, 1836;

Outl. Brit. Fung. 133, 1860—CKE. Handb. Brit. Fung. I, 81, 1871—WINT. Die Pilze, I, 742, 1884.

Omphalina campanella QUÉL. Ench. Fung. 45, 1886.

Omphalia fragilis SACC. Fl. Ital. Crypt., Hymen. 297, 1915.

Omphalopsis campanella MURRILL, North Amer. Fl. IX, 313, 1916.

Caespitose or gregarious. Pileus 8–20 mm. broad, campanulate or convex, then umbilicate or subinfundibuliform; surface yellow-ferruginous, dull orange-yellow or tinged reddish, glabrous, striate, hygrophanous; context concolorous, thin, membranous, taste and odour none; lamellae adnate-decurrent to deeply decurrent, yellowish-white, somewhat crowded to subdistant, prominently connected by veins; stipe 1–3 cm. long, 0.5–2 mm. thick, equal, fistulose, at first yellow above and date-brown below, at length date-brown at all, glabrous, rigid, polished, base whitish or yellowish hairy; spores white in mass, ellipsoidal, smooth, 6–7.5 × 3–3.5 μ.

Hab. on decorticated rotten coniferous wood in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Siberia, Asia Minor, Europe, North America.

Jap. name. *Hime-kabairo-take* (MATSUURA & KANADA).

3. *Omphalia umbratilis* (FR.) GILL.

Hymen. Fr. 299, cum icone, 1874—KARST. Hattsv. I, 137, 1879—SACC. Syll. Fung. V, 330, 1887; Fl. Ital. Crypt., Hymen. 298, 1915—MASS. Brit. Fung. Fl. II, 399, 1893—W. G. SM. Brit. Basid. 88, 1908—RICKEN, Blätterp. 399, 1915—KAUFFM. Agar. Mich. 824, 1918—REA, Brit. Basid. 432, 1922—BRES. Icon. Myc. VI, pl. 267, f. 1, 1928—CEIJ, Rev. Cent. Eur. Sp. Omphalia-Mycena, II, 68, 1929.

Agaricus (Mycena) umbratilis FR. Syst. Myc. I, 157, 1821.

Agaricus (Omphalia) umbratilis FR. Epicr. Myc. 127, 1838; Hymen. Eur. 164, 1874—WINT. Die Pilze, I, 742, 1884.

Omphalina umbratilis QUÉL. Ench. Fung. 45, 1886.

Gregarious or solitary. Pileus 1–3 cm. broad, subcampanulate to convex, then convex-umbilicate; surface glabrous, hygrophanous, black-fuscous or umber-fuscous when moist, hoary when dry, margin striatulate; context concolorous, odour and taste none; lamellae adnate-decurrent, crowded, becoming fuscous-white, broad; stipe 2–5 cm. long, about 2 mm. thick, equal, stuffed, glabrous, subconcolorous; spores white in mass, long-ellipsoidal, 7–9 × 4–5 μ.

Hab. on the ground in woods. Autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Ko-kuro-sakazuki-take* (n. n.).

Marasmius FR.

Gen. Hymen. 9, 1836; Epicr. Myc. 372, 1838.
Androsaceus PAT. Hymen. Eur. 105, 1887.
Marasmius § *Eumarasmius* KARST. Finl. Basidsv. 96, 1889.
Mycetinis EARLE, Bull. N. Y. Bot. Gard. V, 414, 1909.
Collybiopsis EARLE, Ibid. V, 415, 1909.
Scorteus EARLE, Ibid. V, 415, 1909.

Fructification without volva and annulus, usually reviving with moisture, not putrescent. Pileus subfleshy, subcoriaceous or coriaceous, usually membranous, regular or resupinate; margin incurved or not. Stipe central or wanting, cartilaginous or horny. Lamellae adnate, adnexed, decurrent or free, pliant, rather tough. Spores white in mass.

Type species: *Agaricus androsaceus* LINN. ex FR.

Key to the sections, subsections and species in Hokkaido.

I. Pileus fleshy-tough, at length subcoriaceous, sulcate or corrugate, at first involute at the margin; stipe subcartilaginous............ Sect. Collybiae.
  A. Stipe solid or stuffed to hollow, externally villose......Subsect. Scortei.
    1. Stipe pubescent with white villous down; pileus pinkish-buff, smooth.. *M. confluens* (1).
    2. Stipe nearly smooth or slightly villous-pubescent; pileus reddish-brown, becoming yellowish-buff.................. *M. oreades* (2).

II. Pileus submembranous, at first straight and adpressed to the stipe at the margin; stipe coriaceous................................ Sect. Mycenae.
  A. Stipe rigid, rooting or dilated at the base..........Subsect. Chordales.
    1. Stipe glabrous, shining, blackish-brown; pileus ochraceous or cinnamon, radiate-sulcate; lamellae few, very distant..... *M. siccus* (3).
  B. Stipe filiform, flaccid, inserted at the base; pileus soon becoming plane or umbilicate; epiphyllous......................... Subsect. Rotulae.
    1. Stipe glabrous, shining; lamellae attached to a collor free from the stipe.
      a. Pileus white or whitish; stipe shining, blackish-brown.. *M. rotula* (4).
      b. Pileus pale-rufous; stipe shining-black...... *M. graminum* (5).

Sect. Collybiae FR.

Epicr. Myc. 373, 1838.
Agaricus § *Clitocybe* § *Scortei* FR. Syst. Myc. I, 126, 1821.

Pileus fleshy-tough, at length subcoriaceous, sulcate or corrugate, margin at first involute. Stipe subcartilaginous.

Subsect. Scortei FR.

Ibid. 373, 1838.

Stipe solid or stuffed, then hollow, internally fibrous, externally cartilaginous and covered with villous down which is easily removed. Lamellae separating-free.

1. *Marasmius confluens* (PERS. ex FR.) RICKEN

Blätterp. 72, pl. 24, f. 2, 1915—MURRILL, North Amer. Fl. IX, 269, 1915.

Agaricus confluens PERS. Obs. Myc. I, 10, 1796; Icon. Descr. Fung. Fasc. I, 15, pl. 5, f. 1, 1798; Syn. Fung. 368, 1801 (teste FR.).

Agaricus (Clitocybe) confluens FR. Syst. Myc. I, 123, 1821—BERK. in SMITH, Engl. Fl. V, (2), 46, 1836.

Agaricus (Collybia) confluens FR. Epicr. Myc. 88, 1838; Hymen. Eur. 117, 1874—BERK. Outl. Brit. Fung. 116, 1860—CKE. Handb. Brit. Fung. I, 56, 1871; Ill. Brit. Fung. pl. 150, f. B, 1883—WINT. Die Pilze, I, 777, 1884—SCHROET. Pilze Schles. I, 645, 1889.

Collybia confluens QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 95, 1872—GILL. Hymen. Fr. 322, cum icone, 1874—KARST. Hattsv. I, 150, 1879—SACC. Syll. Fung. V, 222, 1887; Fl. Ital. Crypt., Hymen. 238, 1915—MASS. Brit. Fung. Fl. III, 130, 1893—KAUFFM. Agar. Mich. 775, 1918—KAWAMURA, Ill. Jap. Fung. pl. 17, f. 19–21, 1925.

[P. HENN. ENGLERS Bot. Jahrb. XXXI, 738, 1902—MATSUM. Ind. Pl. Jap. I, 136, 1904]

Collybia hariolorum QUÉL. Ench. Fung. 29, 1886.

Marasmius hariolorum REA, Brit. Basid. 522, 1922.

Caespitose or gregarious. Pileus 1–5 cm. broad, convex, then plane, obtuse, rather depressed at the center; surface smooth, pinkish-buff, nearly pinkish-cinnamon at the center when wet, becoming paler or almost white when dry, margin very thin, often involute, even when mature, but often reflexed when old; context very thin, subconcolorous, taste and odour almost none; lamellae free or remote,

very narrow and crowded, whitish, then slightly discolored; stipe 4–12 cm. long, 1.5–4 mm. thick, equal or slightly enlarged at the base, often compressed, concolorous or light chestnut-brown, pubescent with white villous down, confluent at the base, hollow; spores white in mass, ellipsoidal, about 7 × 3.5 μ.

Hab. among fallen leaves, mostly in deciduous woods. Summer to autumn. Ishikari (Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Ama-take* (KAWAMURA).

2. *Marasmius oreades* [BOLT.] FR.

Epicr. Myc. 375, 1838; Hymen. Eur. 467, 1874—BERK. Outl. Brit. Fung. 219, pl. 14, f. 5, 1860—KICKX, Fl. Crypt. Flandr. II, 210, 1867—CKE. Handb. Brit. Fung. I, 233, 1871; Ill. Brit. Fung. pl. 1118, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 219, 1872; Ench. Fung. 142, 1886—GILL. Hymen. Fr. 368, cum icone, 1874—KARST. Hattsv. I, 166, 1879—WINT. Die Pilze, I, 512, 1884—SACC. Syll. Fung. V, 510, 1887—MASS. Brit. Fung. Fl. III, 156, 1893—ATKINS. Mushrooms, ed. 2, 131, f. 129, 1903—W. G. SM. Brit. Basid. 301, 1908—ROLLAND, Atlas Champ. 50, f. 107, 1910—RICKEN, Blätterp. 75, pl. 24, f. 5, 1915—KAUFFM. Agar. Mich. 61, 1918—REA, Brit. Basid. 519, 1922—BRES. Icon. Myc. X, pl. 490, 1929.

Agaricus caryophyllaeus SCHAEFF. Fung. Bavar. IV, Ind. 33, pl. 77, 1774 (teste FR.).

Agaricus oreades BOLT. Hist. Fung. Halif. pl. 151, 1791 (teste FR.).

Agaricus pratensis SOW. Engl. Fung. pl. 247, 1803 (teste FR.).

Agaricus (Clitocybe) oreades FR. Syst. Myc. I, 127, 1821—BERK. in SMITH, Engl. Fl. V, (2), 48, 1836.

Marasmius caryophylleus SCHROET. Pilze Schles. I, 561, 1889—MURRILL, North Amer. Fl. IX, 271, 1915—SACC. Fl. Ital. Crypt., Hymen. 472, 1915.

Scorteus oreades EARLE, Bull. N. Y. Bot. Gard. V, 415, 1909.

Gregarious, usually forming a fairy ring or arc, edible. Pileus 2–6 cm. broad, convex, obtuse or broadly umbonate; surface hygrophanous, reddish brown when young or wet, fading to yellowish flesh-color or yellowish buff or rarely whitish when dry, glabrous, margin at first involute, even or substriate when wet; context pallid or pale-ochraceous, rather thick at the disk, somewhat tough, odour and taste agreeable; lamellae free or rounded behind, whitish or pale yellowish, broad, distant; stipe 4–8 cm. long, 2–5 mm. thick, equal, very tough, whitish, slightly villous-pubescent or nearly smooth, solid; spores white in mass, ellipsoidal, 7–9 × 4–5 μ, smooth.

Hab. on grassy ground in gardens, pastures or roadsides. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe, North America, Siberia, Asia Minor, Australia.

Jap. name. *Shibafu-take* (n. n.).

Sect. **Mycenae** FR.

Epicr. Myc. 381, 1838.

Stipe leathery, fistulose, sometimes stuffed, tough, arid, with corticated rhizomorphoid mycelium. Pileus submembranous, campanulate, then expanded, margin at first straight and adpressed to the stipe.

Subsect. **Chordales** FR.

Ibid. 381, 1838.

Stipe rigid, rooting or adnate by a dilated disc. Pileus campanulate or convex.

3. *Marasmius siccus* (SCHW.) FR.

Epicr. Myc. 382, 1838—SACC. Syll. Fung. V, 535, 1887—KAWAMURA, Ill. Jap. Fung. pl. 4, f. 24–28, 1912—MURRILL, North Amer. Fl. IX, 283, 1915.

[LLOYD, Letter, No. 54, p. 3, 1915—YASUDA, Bot. Mag. (Tokyo), XXIX, (192), 1915—SHIRAI, List Jap. Fung. ed. 2, 341, 1917; ed. 3, 201, 1927]

Agaricus siccus SCHW. Schr. Nat. Ges. Leipzig, I, 84, 1822.

Marasmius campanulatus PK. 23 Ann. Rep. N. Y. State Cab. 126, 1872—SACC. Syll. Fung. V, 535, 1887 (teste MURRILL).

Marasmius fulviceps CLEMENTS, Bot. Surv. Nebr. IV, 20, 1896 (teste MURR.).

Marasmius Clementsianus SACC. et SYD. in SACC. Syll. Fung. XIV, 101, 1899.

Solitary or scattered. Pileus 5–12 mm. broad, convex or campanulate; surface dry, glabrous, ochraceous or cinnamon, somewhat orange-rufous, radiato-sulcate on the margin, thin, membranous; lamellae nearly free, narrowed behind, few, very distant, rather broad, white; stipe 3.5–6 cm. long, 0.5–1.5 mm. thick, blackish-brown, tough, hollow, glabrous, shining; spores white in mass, fusiform or lanceolate, 18–22 × 3.5–5.5 μ.

Hab. on rotting fallen leaves in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), North America.

Jap. name. *Harigane-ochibatake* (KAWAMURA).

Subsect. **Rotulae** FR.

Epicr. Myc. 384, 1838.

Stipe filiform, flaccid, inserted at the base. Pileus soon becoming somewhat plane or umbilicate. Growing on leaves.

4. ***Marasmius rotula*** [SCOP.] FR.

Epicr. Myc. 385, 1838; Hymen. Eur. 477, 1874—BERK. Outl. Brit. Fung. 222, pl. 14, f. 7, 1860—KICKX, Fl. Crypt. Flandr. II, 211, 1867—CKE. Handb. Brit. Fung. I, 238, 1871; Ill. Brit. Fung. pl. 1129, f. A, 1890; Handb. Austr. Fung. 86, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D' Emul. Montb. 2 sér. V, 223, 1872; Ench. Fung. 145, 1886—GILL. Hymen. Fr. 363, cum icone, 1874—KARST. Hattsv. I, 176, 1879—WINT. Die Pilze, I, 505, 1884—SACC. Syll. Fung. V, 541, 1887; Fl. Ital. Crypt., Hymen. 482, 1915—SCHROET. Pilze Schles. I, 558, 1889—MASS. Brit. Fung. Fl. III, 168, 1893—W. G. SM. Brit. Basid. 305, 1908—ROLLAND, Atlas Champ. 50, f. 109, 1910—MURRILL, North Amer. Fl. IX, 282, 1915—RICKEN, Blätterp. 80, pl. 25, f. 10, 1915—KAUFFM. Agar. Mich. 78, 1918—BRES. Icon. Myc. XI, pl. 502, f. 1, 1929.

Agaricus rotula SCOP. Fl. Carn. ed. 2, II, 456, 1772 (teste FR.)—SOW. Engl. Fung. pl. 95, 1797—PERS. Syn. Fung. 467, 1801.

Agaricus androsaccus BULL. Champ. Fr. pl. 64 & 569, f. 3, 1791 (teste FR.).

Agaricus nigripes SCHRAD. Spic. Fl. Germ. 129, 1794 (teste FR.).

Agaricus (Collybia) Rotula FR. Syst. Myc. I, 136, 1821.

Androsaceus rotula PAT. Hymen. Eur. 105, 1887—REA, Brit. Basid. 531, 1922.

Gregarious or solitary. Pileus 2–5 mm. or more broad, convex, umbilicate, membranous; surface white or whitish, becoming brownish when dry, plicate, not polished, margin undulato-crenate; lamellae attached to a collar free from the stipe, white or whitish, becoming yellowish when dry, few, broad, distant; stipe 1–5 cm. long, filiform, fistulose, equal, blackish-brown, smooth, horny, shining; spores white in mass, ovate-oblong or lanceolate-fusiform, acutely attenuated at one end, $6–9 \times 3–4\,\mu$.

Hab. on fallen leaves, twigs in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Siberia, Europe, North America, Africa, Australia.

Jap. name. *Shiro-hime-hôraitake* (n. n.).

5. *Marasmius graminum* (LIBERT) BERK. et BR.

in BERK. Outl. Brit. Fung. 222, pl. 14, f. 8, 1860—CKE. Handb. Brit. Fung. I, 239, 1871—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 223, 1872; Ench. Fung. 145, 1886—FR. Hymen. Eur. 477, 1874—GILL. Hymen. Fr. 363, cum icone, 1874—KARST. Hattsv. I, 176, 1879—WINT. Die Pilze, I, 504, 1884—SACC. Syll. Fung. V, 542, 1887; Fl. Ital. Crypt., Hymen. 481, 1915—SCHROET. Pilze Schles. I, 557, 1889—MASS. Brit. Fung. Fl. III, 169, 1893—W. G. SM. Brit. Basid. 305, 1908—RICKEN, Blätterp. 80, pl. 25, f. 9, 1915—MURRILL, North Amer. Fl. IX, 283, 1915—KAUFFM. Agar. Mich. 79, 1918.

[YASUDA, Bot. Mag. (Tokyo), XXIX, (169), 1915]

Agaricus graminum LIBERT, Pl. Crypt. Ard. Exs. no. 119, 1832.

Androsaceus graminum PAT. Hymen. Eur. 105, 1887—REA, Brit. Basid. 531, 1922.

Gregarious. Pileus 2–5 mm. or more broad, convex to plane, umbonate; surface pale rufous, paler at the furrows, brown at the umbo, sulcate; lamellae attached to a collar free from the stipe, whitish or cream-colored, few, subventricose, distant; stipe 1–4 cm. long, capillary, shining-black, whitish at the apex, glabrous; spores white in mass, ellipsoidal, 8–10 × 4–5 μ.

Hab. on leaves and culms of grasses. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Hime-hôrai-take* (YASUDA).

Tribe **Lentineae** IMAI, nom. nov.

Fructificatio carnoso-coriacea, coriacea vel lignea, lenta, revivescens, persistens, velata vel avelata. Stipes praesens vel nullus. Lamellae acie dentatae, integerrimae, obtusae crispaeque, vel longitudinaliter fissae. Sporae in cumulo albae vel sordide albae.

Key to the genera in the tribe.

1. Edge of lamellae toothed.................................... *Lentinus.*
2. Edge of lamellae entire.. *Panus.*
3. Edge of lamellae obtuse and crisped.............................. *Trogia.*
4. Edge of lamellae split lengthwise.......................... *Schizophyllum.*

Lentinus FR.

Syst. Orb. Veg. I, 77, 1825; Elench. Fung. I, 45, 1828; Genera Hymen. 9, 1836; Epicr. Myc. 387, 1838; Hymen. Eur. 480, 1874.

Agaricus § *Omphalia* § *Lentiscyphi* FR. Syst. Myc. I, 174, 1821.
Lentinellus KARST. Hattsv. I, xviii, 1879.
Hemicybe KARST. Ibid. xviii, 1879.
Pocillaria O. KUNTZE, Rev. Gen. Pl. II, 865, 1891.
Lentodium MORG. Journ. Cinn. Soc. Nat. Hist. XVIII, 36, 1895.
Lentinula EARLE, Bull. N. Y. Bot. Gard. V, 416, 1909.

Fructification with or without universal or partial veil, fleshy-coriaceous or coriaceous, pliant, stipitate or sessile. Pileus more or less irregular. Stipe central, excentric, lateral or wanting, confluent with the pileus. Partial veil, when present, sometimes remaining as a fugacious annulus. Lamellae tough, adnate or decurrent, usually toothed at the edge. Spores white or sordid white in mass.

Type species: *Agaricus tigrinus* BULL. ex FR.

Key to the sections, subsections and species in Hokkaido.

I. Pileus nearly entire, stipe distinct...................... Sect. Mesopodes.
  A. Pileus scaly, more or less manifestly veiled.......... Subsect. Lepidei.
    1. Fructification large, pileus pallid ochraceous, variegated with darker, adpressed spot-like scales becoming brownish or blackish.. .... *L. lepideus* (1).
  B. Pileus villose or pulverulent.................. Subsect. Pulverulenti.
    1. Pileus warm buff with tawny colored slender radial lines and mealy with white powders...................... *L. pulverulentus* (2).
  C. Pileus glabrous................................ Subsect. Cochleati.
    1. Fructification caespitose and imbricate; pileus light ochraceous buff. .... *L. cochleatus* (3).

II. Pileus dimidiate, sessile or furnished with a sublateral stipe.............. .... Sect. Pleuroti.
  A. Fructification large, sessile and usually imbricate.
    1. Pileus corrugate, longitudinally costate, floccose-scrupose all over the surface, alutaceous......................... *L. vulpinus* (4).

2. Pileus coarsely tomentose on the base, glabrous and even on the margin, pinkish-cinnamon or pale reddish brown.... *L. ursinus* (5).

B. Fructification small, subsessile or sessile; pileus glabrous, fawn colored. .... *L. flabelliformis* (6).

Sect. Mesopodes FR.

Hymen. Eur. 481, 1874.

Pileus nearly entire; stipe distinct.

Subsect. Lepidei FR.

Ibid. 481, 1874.

Pileus scaly, more or less manifestly veiled.

1. *Lentinus lepideus* FR.

Syst. Orb. Veg. I, 78, 1825; Epicr. Myc. 390, 1838; Hymen. Eur. 481, 1874—BERK. Outl. *Brit. Fung.* 225, *1860*—*CKE. Handb. Brit. Fung. I, 242, 1871;* Ill. Brit. Fung. pl. 1140, 1890; Handb. Austr. Fung. 91, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 225, 1872; Ench. Fung. 150, 1886—GILL. Hymen. Fr. 381, cum icone, 1874—KARST. Hattsv. I, 245, 1879—WINT. Die Pilze, I, 501, 1884—SACC. Syll. Fung. V, 581, 1887—MASS. Brit. Fung. Fl. II, 313, 1893—W. G. SM. Brit. Basid. 309, 1908—KAWAMURA, Ill. Jap. Fung. pl. 10, f. 13–15, 1914—RICKEN, Blätterp. 83, 1915—KAUFFM. Agar. Mich. 53, pl. 6, 1918—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XX, 371, pl. 14, 16, 17, 1921—REA, Brit. Basid. 537, 1922.

[KAWAMURA, Bot. Mag. (Tokyo), XXIII, (356), 1909—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 114, 1931]

Agaricus squamosus SCHAEFF. Fung. Bavar. IV, Ind. 15, pl. 29–30, 1774 (teste FR.).

Agaricus lepideus FR. Obs. Myc. I, 21, 1815; Syst. Myc. I, 176, 1821.

Lentinus suffrutescens FR. Syst. Orb. Veg. I, 78, 1825; Epicr. Myc. 393, 1838 (teste MURRILL).

Lentinus squamosus QUÉL. Fl. Myc. 328, 1888—SCHROET. Pilze Schles. I, 556, 1889—SACC. Fl. Ital. Crypt., Hymen. 495, 1915—BRES. Icon. Myc. XI, pl. 510, 1929.

Lentinus magnus PK. Bull. Torrey Bot. Club, XXIII, 413, 1896 (teste MURRILL).

Lentinus spretus PK. 105 Bull. N. Y. State Mus. 24, 1906 (teste MURRILL).

Lentodium squamosum MURRILL, Mycologia, *III, 27, 1911;* North Amer. Fl. IX, 296, 1915.

Solitary or caespitose, edible. Pileus 5–15 cm. broad, convex, then expanded to nearly plane, sometimes slightly depressed in the center and sometimes umbonate; surface white or pale-ochraceous, the pellicle cracking and usually forming brownish, spot-like scales, which are sometimes almost black, dry; context white, thick, fleshy to

tough, compact, hard when dry, with agreeable odour; lamellae sinuate or sinuato-decurrent, subdistant, broad, transversely lacerate and dentate-serrate on the edges, white, then yellowish; stipe 2–8 cm. long, 10–15 mm. thick, subequal, often pointed and rooted at the base, concolorous, blackish at the base, fibrillose-squamose, solid, sometimes excentric; annulus fixed, white, often disappearing; spores white in mass, long-oblong or subcylindric, smooth, 10–15 × 4–5 μ.

Hab. on structural timbers or living or rotting trunks, especially of coniferous trees. Summer to autumn. Ishikari (Sapporo), Kuriles (Matsuwa Is.).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Siberia, Asia Minor, Australia.

Jap. name. *Matsu-ôji* (KAWAMURA).

Subsect. **Pulverulenti** FR.

Hymen. Eur. 482, 1874.

Pileus villose or pulverulent.

2. *Lentinus pulverulentus* [SCOP.] FR.

Epicr. Myc. 391, 1838; Hymen. Eur. 483, 1874—WINT. Die Pilze, I, 500, 1884—QUÉL. Ench. Fung. 151, 1886—SACC. Syll. Fung. V, 588, 1887—MASS. Brit. Fung. Fl. II, 314, 1893—REA Brit. Basid. 538, 1922.

Agaricus pulverulentus SCOP. Fl. Carn. ed. 2, II, 434, 1772 (teste FR.).

Subcaespitose. Pileus 3.5–6 cm. broad, convex, then plane; surface mikado-brown and mealy with white powders when young, then becoming warm-buff and with tawny colored slender radial lines on the center and paler with mealy powders on the margin, margin incurved at first, then upturned, paler, having white villi; context white, fleshy, pliant, taste and odour pleasant; lamellae long decurrent, whitish or pallid, rather distant, serrate on the edge, broad; stipe 4–6 cm. long, 1–2 cm. thick, attenuated downward or subequal, paler than the pileus, pulverulently tomentose, stuffed; spores white in mass, long elliptical or subcylindrical-elliptic, smooth, 6–10 × 2.5–3 μ.

Hab. on structural timbers or dead wood of conifers. Spring to summer. Ishikari (Sapporo, Mt. Teine), Kitami (Naetaro).

Distr. Japan (Hokkaido), Europe, ?North America.

Jap. name. *Namiha-take* (n. n.).

Subsect. Cochleati FR.

Hymen. Eur. 483, 1874.

Pileus glabrous.

3. *Lentinus cochleatus* [PERS.] FR.

Syst. Orb. Veg. I, 78, 1825; Epicr. Myc. 394, 1838; Hymen. Eur. 484, 1874—BERK. Outl. Brit. Fung. 226, pl. 19, f. 4, 1860—CKE. Handb. Brit. Fung. I, 242, 1871; Ill. Brit. Fung. pl. 1142, f. A, 1890; Handb. Austr. Fung. 93, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 225, 1872; Ench. Fung. 150, 1886—GILL. Hymen. Fr. 381, cum icone, 1874—WINT. Die Pilze, I, 498, 1884—SACC. Syll. Fung. V, 594, 1887; Fl. Ital. Crypt., Hymen. 489, 1915—MASS. Brit. Fung. Fl. II, 315, 1893—W. G. SM. Brit. Basid. 310, 1908—RICKEN, Blätterp. 86, pl. 26, f. 1, 1915—KAUFFM. Agar. Mich. 55, 1918—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XX, 379, pl. 23, 1921—REA, Brit. Basid. 539, 1922—BRES. Icon. Myc. XI, pl. 513, 1929.

Agaricus cornucopioides BOLT. Hist. Fung. Half. 8, pl. 8, 1788 (teste FR.).

Agaricus cochleatus PERS. Disp. Fung. 22, 1797; Syn. Fung. 450, 1801 (teste FR.); Myc. Eur. III, 51, 1828.

Agaricus confluens SOW. Engl. Fung. pl. 168, 1799 (teste FR.).

Agaricus (*Omphalia*) *cochleatus* FR. Syst. Myc. I, 177, 1821.

Lentinellus cochleatus KARST. Hattsv. I, 247, 1879.

Lentinus cornucopioides SCHROET. Pilze Schles. I, 555, 1889.

Lentinellus cornucopioides MURRILL, North Amer. Fl. IX, 295, 1915.

Caespitose and imbricate. Pileus 3–9 cm. broad, irregular, very unequal, ear-shaped, spathulate, nearly plane or depressed at the center and cyathiform or infundibuliform-umbilicate; surface glabrous, light-ochraceous-buff, light pinkish-cinnamon or pinkish-cinnamon to mikado-brown, paler when dry, somewhat lobed or contorted; context whitish or subconcolorous, odour anise, taste mild; lamellae decurrent, close, whitish tinged with flesh color, edge serrulate, thin; stipe 2–8 cm. long, 5–15 mm. thick, excentric, sublateral or central, branched, confluent at the base, deeply sulcate, glabrous, firm, solid, concolorous or slightly darker; spores white in mass, subglobose, smooth, 3–5 μ.

Hab. on or about old stumps or buried wood in woods. Summer to autumn. Ishikari (Nopporo, Mt. Kurodake).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America, Australia.

Jap. name. *Mimi-namihatake* (n. n.).

Sect. Pleuroti FR.

Hymen. Eur. 485, 1874.

Dimidiate, sessile or laterally stipitate.

4. *Lentinus vulpinus* [SOW.] FR.

Syn. Gen. Lentin. 12, 1836; Epicr. Myc. 395, 1838; Hymen. Eur. 486, 1874—BERK. Outl. Brit. Fung. 226, 1860—CKE. Handb. Brit. Fung. I, 243, 1871; Handb. Austr. Fung. 95, 1892—QUÉL. Ench. Fung. 151, 1886—SACC. Syll. Fung. V, 609, 1887; Fl. Ital. Crypt., Hymen. 487, 1915—MASS. Brit. Fung. Fl. II, 317, 1893—ATKINS. Mushrooms, ed. 2, 134, f. 131, 1903—W. G. SM. Brit. Basid. 310, 1908—RICKEN, Blätterp. 87, 1915—KAUFFM. Agar. Mich. 56, 1918—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XX, 383, pl. 27, 1921—REA, Brit. Basid. 540, 1922—BRES. Icon. Myc. XI, pl. 516, 1929.

Agaricus vulpinus SOW. Engl. Fung. pl. 361, 1803 (teste FR.).

Agaricus (Crepidotus) vulpinus FR. Syst. Myc. I, 273, 1821.

Hemicybe vulpina KARST. Hattsv. I, 249, 1879.

Panellus vulpinus MURRILL, North Amer. Fl. IX, 246, 1915.

Imbricate-multiplex. Pileus 5–10 cm. broad, sessile, reniform-conchate, convex; surface corrugate, longitudinally costate, floccose-scrupose, nearly flesh color or alutaceous, margin incurved, entire, discolored with age; context fleshy to somewhat tough, white then subalutaceous; lamellae crowded, broad, dentate-lacerate, white then reddish; spores white in mass, subglobose, smooth, $4–4.5 \times 2.5–3.5\ \mu$, or $3–4\ \mu$.

Hab. on stumps and logs of frondose wood. Autumn. Kushiro (Mt. Meakan).

Distr. Japan (Hokkaido), Europe, North America, Australia.

Jap. name. *Kitsune-namihatake* (n. n.).

5. *Lentinus ursinus* FR.

Epicr. Myc. 395, 1838; Hymen. Eur. 486, 1874—WINT. Die Pilze, I, 498, 1884—SACC. Syll. Fung. V, 608, 1887; Fl. Ital. Crypt., Hymen. 488, 1915—RICKEN, Blätterp. 84, 1915—KAUFFM. Agar. Mich. 56, 1918—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XX, 383, pl. 28, 1921—BRES. Icon. Myc. XI, pl. 515, f. 1, 1929.

Agaricus (Pleurotus) ursinus FR. Syst. Myc. I, 185, 1821.

Hemicybe ursina KARST. Hattsv. I, 248, 1879.

Lentinus hyracinus KALCHBR. Grev. X, pl. 143, f. 18 (teste BRES.)—SACC. Syll. Fung. V, 608, 1887.

Panellus ursinus MURRILL, North Amer. Fl. IX, 246, 1915.

Imbricate-multiplex. Pileus 1–4 cm. or more broad, sessile, subreniform or conchate to semiorbicular, convex; surface pinkish-cinnamon, pale reddish brown or subalutaceous, coarsely tomentose on the base, even and glabrous on the margin; context subfleshy or fleshy-tough, whitish or brownish; lamellae subcrowded or crowded, broad, dentate-lacerate, whitish then discolored to brownish or pinkish; spores white in mass, subglobose or broadly ellipsoidal, 3.5–4.5 × 3–4 μ, smooth.

Hab. on stumps and logs of frondose wood. Autumn. Oshima (Shiriuchi).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Itachi-namiha-take* (n. n.).

6. *Lentinus flabelliformis* [BOLT.] FR.

Syst. Orb. Veg. I, 78, 1825; Epicr. Myc. 395, 1838; Monogr. Hymen. Suec. II, 239, 1863; Hymen. Eur. 487, 1874—BERK. Outl. Brit. Fung. 226, 1860—CKE. Handb. Brit. Fung. I, 243, 1871—WINT. Die Pilze, I, 497, 1884—QUÉL. Ench. Fung. 151, 1886—SACC. Syll. Fung. V, 610, 1887; Fl. Ital. Crypt., Hymen. 487, 1915—SCHROET. Pilze Schles. I, 555, 1889—MASS. Brit. Fung. Fl. II, 317, 1893—RICKEN, Blätterp. 87, 1915—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XX, 380, pl. 24, 1921—REA, Brit. Basid. 540, 1922.

Agaricus flabelliformis BOLT. Hist. Fung. Halif. 157, pl. 157, 1791 (teste FR.)—PERS. Syn. Fung. 479, 1801.

Agaricus (Pleurotus) flabelliformis FR. Syst. Myc. I, 185, 1821.

Hemicybe flabelliformis KARST. Hattsv. I, 250, 1879.

Imbricated. Pileus 1–3 cm. broad, sessile or subsessile, orbicular or reniform, plane or somewhat depressed behind, even, glabrous, fawn-colored or pale cinnamon, margin more or less crenulate; lamellae whitish or pallid, rather broad, somewhat distant, toothed at the edges; stipe usually rudimentary or wanting; spores white in mass, subglobose or broadly ellipsoidal, 5–6 × 3–4 μ.

Hab. on dead wood in woods. Autumn. Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Hime-ôgi-namiha* (n. n.).

Panus FR.

Epicr. Myc. 396, 1838; Hymen. Eur. 487, 1874.
Panellus KARST. Hattsv. I, xiv, 1879.

Fructification without annulus and volva, fleshy-coriaceous or coriaceous, reviving with moisture, stipitate or sessile. Pileus excentric, dimidiate or resupinate. Stipe when present lateral or excentric, confluent with the pileus. Lamellae soft, then coriaceous, decurrent or arising from a central point. Spores white in mass.

Type species: *Agaricus stipticus* BULL. ex FR.

Key to the sections and species in Hokkaido.

I. Pileus irregular; stipe excentric.......................... Sect. Conchati.
  1. Pileus ochraceous fawn color, strigose with erect, fascicled, concolorous hairs.. *P. rudis*(1).
II. Stipe definitely lateral.................................... Sect. Stiptici.
  1. Pileus pinkish-buff to cinnamon, taste very astringent.. *P. stipticus*(2).

Sect. Conchati QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 226, 1872.

At first more soft, excentric, not furfuraceous.

1. *Panus rudis* FR.

Epicr. Myc. 398, 1838; Hymen. Eur. 489, 1874—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 226, pl. 14, f. 1, 1872—GILL. Hymen. Fr. 383, 1874—KARST. Hattsv. I, 96, 1879—WINT. Die Pilze, I, 496, 1884—SACC. Syll. Fung. V, 616, 1887; Fl. Ital. Crypt., Hymen. 500, 1915—W. G. SM. Brit. Basid. 312, 1908—RICKEN, Blätterp. 88, pl. 26, f. 4, 1915—KAUFFM. Agar. *Mich. 48, pl. 5, 1918—REA, Brit. Basid. 535, 1922—BRES.* Icon. *Myc. XI, pl. 519,* 1929—MALKOV. Ann. Myc. XXX, 36, pl. 1, 2, 1932.

[YASUDA, Bot. Mag. (Tokyo), XXVII, (305), 1913]

Agaricus crinitus SCHW. Schr. Nat. Ges. Leipzig, I, 89, 1822 (teste MURRILL).

Agaricus strigosus SCHW. Ibid. I, 89, 1822 (teste MURRILL).

Lentinus Lecomtei FR. Syst. Orb. Veg. I, 77, 1825.

Lentinus strigosus FR. Ibid. 77, 1825—MURRILL, North Amer. Fl. IX, 292, 1915.

[LLOYD, Letter, No. 60, p. 6, *1915;* No. 61, *p. 5, 1916;* No. *65,* p. 5, 1917—HORIKAWA, Trans. Form. Nat. Hist. Soc. No. 37, p. 136, 1918—SAWADA, Descrip. Cat. Form. Fung. V, 87, 1931]

Agaricus hirtus SECR. Myc. Suisse, no. 1073, 1833 (teste FR.).

Lentinus chaetophorus LÉV. Ann. Sci. Nat., Bot. 3 sér. II, 177, 1844.

?*Panus levis* BERK. et CURT. Ann. Mag. Nat. Hist. 2 ser. XII, 427, 1853.

Lentinus sparsibarbis BERK. et CURT. Journ. Linn. Soc., Bot. X, 301, 1868.

Panus hirtus QUÉL. Ench. Fung. 152, 1886.

Lentinus substrigosus P. HENN. et SHIRAI, in P. HENN. ENGLERS Bot. Jahrb. XXVIII, 270, 1900—SACC. Syll. Fung. XVI, 64, 1902.

Lentinus rudis P. HENN. ENGLERS Bot. Jahrb. XXXII, 40, 1902.

[MATSUM. Ind. Pl. Jap. I, 150, 1904—YASUDA, Bot. Mag. Tokyo, XXVII, (305), 1913—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 114, 1931]

Gregarious or caespitose. Pileus 2–8 cm. broad, excentric, convex, then cyathiform or subinfundibuliform; surface strigose with erect, fascicled, concolorous hairs, purplish or fleshy-lilac color, becoming ochraceous fawn colored, margin slightly incurved or subexpanded; context subcoriaceous, thin, tough, taste mild; lamellae decurrent, crowded, narrow, nearly entire, pallid, not anastomosing; stipe 1–3 cm. long, 2–6 mm. thick, densely strigose, subconcolorous, solid, tough; spores white in mass, oblong-subclavate, slightly curved, smooth, 6–8 × 3–4 μ.

Hab. on old logs and stumps of both coniferous and deciduous trees. Summer to autumn. Ishikari (Sapporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), China, Siberia, Asia Minor, Europe, North America.

Jap. name. *Arage-Kawaki-take* (YASUDA).

Sect. **Stiptici** QUÉL.

Ibid. V, 227, 1872.

At first coriaceous, lateral or resupinate, pellicle powdery-breaking.

2. ***Panus stipticus*** [BULL.] FR.

Epicr. Myc. 399, 1838; Hymen. Eur. 489, 1873—BERK. Outl. Brit. Fung. 227, 1860—KICKX, Fl. Crypt. Flandr. II, 212, 1867—CKE. Handb. Brit. Fung. I, 245, 1871; Ill. Brit. Fung. pl. 1144, f. A, 1890; Handb. Austr. Fung. 97, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 227, 1872; Ench. Fung. 152, 1886—GILL. Hymen. Fr. 383, cum icone, 1874—WINT. Die Pilze, I, 495, 1884—SACC. Syll. Fung. V, 622, 1887—MASS. Brit. Fung. Fl. II, 309, 1893—W. G. SM. Brit. Basid. 312, 1908—ROLLAND, Atlas Champ. 51, f. 111, 1910—RICKEN, Blätterp. 88, pl. 26, f. 3, 1915—KAUFFM. Agar. Mich. 48, 1918—REA, Brit. Basid. 535, 1922—BRES. Icon. Myc. XI, pl. 521, 1929—MALKOV. Ann. Myc. XXX, 29, 1932.

[YASUDA, Bot. Mag. (Tokyo), XVI, (419), 1912—LLOYD, Letter, No. 63, p. 9, 1916]

Agaricus semipetiolatus SCHAEFF. Fung. Bavar. IV, Ind. 47, f. 208, 1774 (teste FR.).

Agaricus stipticus BULL. Champ. Fr. pl. 140, 1791 (teste FR.)—PERS. Syn. Fung. 481, 1801.

Agaricus (Pleurotus) stipticus FR. Syst. Myc. I, 188, 1821—BERK. in SMITH, Engl. Fl. V, (2), 73, 1836.

Panellus stipticus KARST. Hattsv. I, 96, 1879—MURRILL, North Amer. Fl. IX, 244, 1915.

Lentinus stipticus SCHROET. Pilze Schles. I, 554, 1889.

[YASUDA, Bot. Mag. (Tokyo), XXX, 395, 1916]

Panus semipetiolatus SACC. Fl. Ital. Crypt., Hymen. 498, 1915.

Gregarious, caespitose, densely imbricated, said to be poisonous. Pileus 1–2 cm. broad, convex, reniform; surface dry, variable in color, pinkish-buff to cinnamon, margin incurved, rarely undulate, pellicle broken up into mealy granules; context thin, elastic, yellowish, taste very astringent; lamellae ochraceous or cinnamon, becoming darker when dry, very narrow, crowded, thin, ending determinately, connected by veins; stipe 2–4 mm. long, 2–4 mm. thick, lateral, dilated upward, flattened, ascending, pruinose, grayish or paler then the lamellae, coriaceous, solid; cystidia present on the edge of lamellae, lanceolate, about 30–50 × 2.5–3.5 μ; spores white in mass, ellipsoidal, about 5 × 2.5 μ.

Hab. on the rotten bark of various kinds of trees in woods. Summer to autumn. Oshima (Ônomura), Iburi (Chitose, Lake side of Shikotsu), Ishikari (Sapporo, Nopporo, Jôzankei, Mt. Kurodake), Kushiro (Lake side of Akan, Mt. Meakan), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Siberia, Asia Minor, Europe, North America, Australia.

Jap. name. *Wasabi-take* (KAWAMURA), *Hime-Kawaki-take* (YASUDA).

Trogia FR.

Genera Hymen. 10, 1836, p. p.; Epicr. Myc. 402, 1838, p. p.; Hymen. Eur. 491, 1874.

Plicatura PK. 24 Ann. Rept. N. Y. State Mus. 75, 1872—MURRILL, North Amer. Fl. IX, 163, 1910, p. p.—REA, Brit. Basid. 625, 1922.

Fructification without universal and partial veils, spongy-coriaceous or coriaceous, reviving with moisture, sessile or substipitate. Pileus soft, faccid, dimidiate. Lamellae obtusely veined, fold-like, lamella-like in front, crisped and branched behind, fertile on the edge; spores white in mass.

Type species: *Cantharellus crispus* [PERS.] FR.

Trogia crispa [PERS.] FR.

Monogr. Hymen. Suec. II, 244, 1863; Hymen. Eur. 492, 1874—CKE. Handb. Brit. Fung. I, 246, 1871; Ill. Brit. Fung. pl. 1114, f. A, 1890; Handb. Austr. Fung. 100, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 227, 1872—KARST. Hattsv. I, 244, 1879—WINT. Die Pilze, I, 494, 1884—SACC. Syll. Fung. V, 636, 1887—MASS. Brit. Fung. Fl. II, 303, 1893—ATKINS. Mushrooms, ed. 2, 137, f. 134, 1903—W. G. SM. Brit. Basid. 314, 1908—RICKEN, Blätterp. 6, pl. 2, f. 5, 1915—KAUFFM. Agar. Mich. 41, 1918.

[LLOYD, Letter, No. 47, p. 9, 1913; Myc. Notes No. 71, p. 1265, 1924—YASUDA, Bot. Mag. (Tokyo), XXVII, (503), 1913]

Merulius fagineus SCHRAD. Spic. Fl. Germ. 137, 1794 (teste FR.).

Merulius crispus PERS. Icon. Desc. Fung. 32, pl. 8, f. 7, 1800 (teste FR.); Syn. Fung. 495, 1801; Myc. Eur. II, 23, 1825.

Cantharellus crispus FR. Syst. Myc. I, 323, 1821; Epicr. Myc. 369, 1838—GILL. Hymen. Fr. 356, cum icone, 1874.

Trogia faginea SCHROET. Pilze Schles. I, 508, 1889—SACC. Fl. Ital. Crypt., Hymen. 503, 1915.

Plicatura faginea KARST. Finl. Basidsv. 342, 1889—MURRILL, North Amer. Fl. IX, 164, 1910.

Plicatura crispa REA, Brit. Basid. 626, 1922.

Gregarious. Pileus 5–30 mm. broad, cup-shaped, sessile or substipitate, then reflexed, dimidiate, often lobed, villose, glabrescent, slightly zoned, light yellow, rufescent, whitish at the margin, becoming bluish leather color when dry; lamellae decurrent, white or subconcolorous with the pileus or bluish-leather-colored, vein-like, dichotomous, narrow, crisped, very much swollen, edge obtuse; context whitish, fibrillose, firm, tough, odour and taste none; spores white in mass, cylindrical, 3–5 × 1–2 μ, smooth.

Hab. on dead trunks of various trees in woods. Summer to autumn. Ishikari (Sapporo, Jôzankei), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Chijire-take* (YASUDA).

Schizophyllum FR.

Obs. Myc. I, 103, 1815; Syst. Myc. I, 5 & 330, 1821.
Schizonia PERS. Myc. Eur. *III, 14, 1828.*
Hyponevris PAUL. ex EARLE, Bull. N. Y. Bot. Gard. V, 411, 1909.

Fructification without universal and partial veils, coriaceous, reviving with moisture, sessile or substipitate. Pileus resupinate, sessile or lateral. Lamellae radiating from a central point, becoming longitudinally split and revolute at the edge. Spores white in mass.

Type species: *Schizophyllum commune* FR.

Schizophyllum commune FR.

Obs. Myc. I, 103, 1915; Syst. Myc. I, 330, 1821; Epicr. Myc. 403, 1838; Hymen. Eur. 492, 1874—BERK. in SMITH, Engl. Fl. V, (2), 130, 1836; Outl. Brit. *Fung. 228, 1860*—KICKX, *Fl.* Crypt. Flandr. *II, 213, 1867*—CKE. Handb. Brit. Fung. I, 247, f. 60, 1871; Ill. Brit. Fung. pl. 1114, f. B, 1890; Handb. Austr. Fung. 100, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 *sér. V, 228, 1872; Ench. Fung. 154, 1886*—GILL. Hymen. Fr. *375,* cum icone, 1874—KARST. Hattsv. I, 245, 1879—WINT. Die Pilze, I, 493, 1884—SACC. Syll. Fung. V, 655, 1887—MASS. Brit. Fung. Fl. II, 302, 1893—W. G. SM. Brit. Basid. *314, f. 71, 1908*—ROLLAND, Atlas Champ. 49, *f. 105, 1910*—KAWAMURA, Ill. Jap. Fung. pl. 15, f. 4–7, 1915—RICKEN, Blätterp. 90, pl. 26, f. 6, 1915—KAUFFM. Agar. Mich. 43, 1918—REA, Brit. Basid. 452, 1922—BRES. Icon. Myc. XI, pl. 522, *1922*—LINDER, Amer. Journ. Bot. XX, 555, pl. 33, *f. 6,* pl. 34, *f.* 1, pl. 35, *f.* 1–6, 1933.

[ÔKUBO, Bot. Mag. (Tokyo), II, (1), 1888—LLOYD, Myc. Writ. III, Letter, *No. 38, p. 10, 1911; Ibid. No. 42, p. 13, 16, 1912; Ibid. No. 63, p. 7, 1916; Ibid.* No. 65, p. 6, 1917—UMEMURA, Pl. Fujiyama. 372, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 114, 1931]

Agaricus alneus L. Sp. Pl. 1176, 1753 (*teste* FR.).

Schizonia vulgaris PERS. Myc. Eur. III, 14, 1828.

Schizophyllum alneum SCHROET. Pilze Schles. I, 553, 1889—SACC. Fl. Ital. Crypt., Hymen. 511, 1915—MURRILL, North Amer. Fl. IX, 237, 1915.

[P. HENN. ENGLERs Bot. Jahrb. XXVIII, 270, 1901; Ibid. XXXII, 40, 1903 —MATSUM. Ind. Pl. Jap. I, 172, 1904—UMEMURA, Bot. Mag. (Tokyo), XXVI, (153), 1912—YASUDA, Bot. Mag. (Tokyo), XXVI, (20), 1912—NAKAJI, Bot. Mag. (Tokyo), XXX, (102), 1916—SAWADA, Descr. Cat. Formosan Fung. I, 515, 1919]

Gregarious, caespitose, imbricated. Pileus 1–3 cm. broad and long, flabelliform or suborbicular or often much lobed, sessile by the narrowed base, often pendulous; surface whitish, grayish or brownish, very hairy, tomentose or strigose, reviving with moisture; context very arid, whitish or brownish; lamellae radiating from the point

of attachment of the pileus, longitudinally splitting and revolute at edge, narrow, whitish, grayish, or brownish, hirsute on the abhymenial side; spores white in mass, cylindrical and obliquely apiculate, 4–7 × 1.5–2 μ.

Hab. on dead wood of various kinds of trees and stems of herbs. All seasons. Common in our district.

Distr. Cosmopolitan in the temperate regions.

Jap. name. *Suehiro-take* (ÔKUBO).

Subfam. **Volvarioideae** IMAI, nom. nov.

Hyporhodii FR. Epicr. Myc. 138, 1838; Hymen. Eur. 182, 1874.
Rhodospori QUÉL. Ench. Fung. 54, 1886.
Rhodosporae SACC. Syll. Fung. V, 656, 1887.

Trama floccosa, carnosa, mollis, non vesiculosa. Hymenium superficiem lamellae acris tegit. Sporae in cumulo rosae vel roseorubiginosae, in plurimis angulosae.

Tribe **Volvarieae** IMAI, nom. nov.

Volvariées ROZE, Bull. Soc. Bot. Fr. XXIII, 51 & 111, 1876, p. p.
Pluteinées ROZE, Ibid. 51 & 111, 1876, p. p.
Pluteides FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 363, 1889.
Volvariées KONRAD et MAUBL. Icon. Sel. Fung. 28 & 51, 1925.

Fructificatio juvenile volo universali partialive clausa vel nulla. Pileus a stipite discretus separabilisque. Lamellae vulgo liberae.

Key to the genera in Tribe Volvarieae.

1. Fructification with volva and without annulus .... *Volvaria.*
2. Fructification without annulus and volva .... *Pluteus.*

Volvaria (FR.) QUÉL.

Champ. Jura Vosg. in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 114, 1872.
Volvarius ROUSSEL, Fl. Calvados, ed. 2, 59, 1806.

Agaricus § *Volvaria* FR. Syst. Myc. I, 11 & 277, 1821; Epicr. Myc. 138, 1838; Hymen. Eur. 182, 1874.

Pseudofarinaceus BATT. ex EARLE, Bull. N. Y. Bot. Gard. V, 449, 1909.

Volvariopsis MURRILL, Mycologia, III, 280, 1911; North Amer. Fl. X, 140, 1917.

Fructification with universal veil remaining as a volva, usually without partial veil. Pileus fleshy, regular. Stipe central, fleshy, distinct and separable from the pileus. Universal veil usually remaining as a membranous volva at the base of stipe and patches or rarely warts on the pileus. Partial veil usually lacking. Lamellae free, rarely subadnate. Spores rose or pink in mass.

Type species: *Agaricus bombycinus* SCHAEFF. ex FR.

Key to the sections and species in Hokkaido.

I. Pileus dry, silky or fibrillose .... Sect. Siccae.
  1. Pileus large, white, becoming yellowish, silky, squamuloso-villose .... *V. bombycina* (1).
  2. Pileus medium to large, cinereous, black-streaked with adpressed fibrils. .... *V. volvacea* (2).

II. Pileus more or less viscid, glabrous .... Sect. Viscosae.
  1. Pileus medium to large, whitish, but grayish or umber at the disc, viscid. .... *V. speciosa* (3).
  2. Pileus medium to large, fuliginous, viscid .... *V. gloiocephala* (4).

Sect. Siccae SACC.

Fl. Ital. Crypt., Hymen. 514, 1915.

Pileus dry, silky or fibrillose.

1. *Volvaria bombycina* (SCHAEFF. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 114, 1872; Ench. Fung. 54, 1886—GILL. Hymen. Fr. 387, cum icone, 1874—KARST. Hattsv. I, 250, 1879—SACC. Syll. Fung. V, 656, 1887; Fl. Ital. Crypt., Hymen. 518, 1915—SCHROET. Pilze Schles. I, 621, 1889—MASS. Brit. Fung. Fl. II, 292, 1893—ATKINS. Mushrooms, ed. 2, 140, f. 137, 1903—W. G. SM. Brit. Basid. 98, 1908—RICKEN, Blätterp. 275, 1915—KAUFFM. Agar. Mich. 527, pl. 100, 1918—REA, Brit. Basid. 94, 1922—LANGE, Agar. Denm. VII, 4, 1928—BRES. Icon. Myc. XI, pl. 526, 1929.

[IMAI, Bot. Mag. (Tokyo), XLVII, 431, 1933]

Agaricus bombycinus SCHAEFF. Fung. Bavar. IV, Ind. 42, pl. 98, 1774 (teste FR.).

Agaricus incarnatus BATSCH, Elench. Fung. 51, 1783 (teste FR.).

Amanita incarnata PERS. Syn. Fung. 248, 1801 (teste FR.).

Agaricus (Volvaria) bombycinus FR. Syst. Myc. I, 277, 1821; Epicr. Myc. 138, 1838; Hymen. Eur. 182, 1874—BERK. in SMITH, Engl. Fl. V. (2), 104, 1836; Outl. Brit. Fung. 139, pl. 7, f. 1, 1860—RABENH. Deut. Krypt. Fl. I, 512, 1844—BARLA, Champ. Nice, 50, pl. 25, f. 1–5, 1859—CKE. Handb. Brit. Fung. I, 84, 1871; Ill. Brit. Fung. pl. 293, 1886; Handb. Austr. Fung. 37, 1892—WINT. Die Pilze, I, 730, 1884.

Volvariopsis bombycina MURRILL, Mycologia, III, 281, 1911; North Amer. Fl. X, 143, 1917.

Volvaria bombycina var. *Maxima* PILÁT, Bull. Soc. Myc. Fr. XLVIII, 293, pl. 30–31, 1932.

Solitary. Pileus 10–23 cm. or more broad, globose, then campanulate, finally nearly umbonate; surface dry, white, densely covered with white or yellowish silky-fibrous hairs, disc rarely becoming smooth and darker, often provided with patches of the volva; context white, becoming yellowish, taste and odour none; lamellae free or remote, white at first, then pinkish, broad, crowded, ventricose, waved at the edge; stipe 10–20 cm. long, 8–20 mm. thick, attenuated upward, bulbous at the base, usually curved, white, silky-fibrous; volva large, persistent, white or whitish at first, then discolored to yellowish or brownish, ensheathing the base of stipe, membranous, lax, torn irregularly at the top, up to 10 cm. long; spores pink in mass, broadly ellipsoidal, 7.5–9 × 6–6.5 μ.

Hab. on dead wood or bark of living trees. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu, Bonin Islands), Europe, North America, Australia, Africa, Siberia, Asia Minor.

Jap. name. *Kinu-ô-fukuro-take* (IMAI).

PILÁT reported a gigantic variety from Asia Minor whose pileus is 25 cm. broad. It was growing on *Abies Bornmuelleriana* MATTF. Our gigantic specimen was 23 cm. in width of the pileus and growing on the bark of living *Ulmus japonica* SARG.

2. *Volvaria volvacea* (BULL. ex FR.) QUÉL.

Ench. Fung. 54, 1886—SACC. Syll. Fung. V, 657, 1887; Fl. Ital. Crypt., Hymen. 517, 1915—SCHROET. Pilze Schles. I, 621, 1889—MASS. Brit. Fung. Fl. II, 293, 1893—W. G. SM. Brit. Basid. 98, 1908—ROLLAND, Atlas Champ. 56, f. 122, 1910—RICKEN, Blätterp. 273, 1915—REA, Brit. Basid. 94, 1922.

[IMAI, Bot. Mag. (Tokyo), XLVII, 431, 1933]

Agaricus volvaceus BULL. Champ. Fr. pl. 262, 1791 (teste FR.)—SOW. Engl. Fung. pl. 1, 1797.

Amanita virgata PERS. Syn. Fung. 249, 1801 (teste FR.).

Agaricus (Volvaria) volvaceus FR. Syst. Myc. I, 278, 1821; Epicr. Myc. 138, 1838; Hymen. Eur. 182, 1874—BERK. in SMITH, Engl. Fl. V, (2), 104, 1836; Outl. Brit. Fung. 140, 1860—RABENH. Deut. Krypt. Fl. I, 512, 1844—BARLA, Champ. Nice, 51, pl. 25, f. 6–13, 1859—KICKX, Fl. Crypt. Flandr. II, 161, 1867—CKE. Handb. Brit. Fung. I, 84, 1871; Ill. Brit. Fung. pl. 294, 1886—WINT. Die Pilze, I, 730, 1884.

Volvaria virgata QUÉL. Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 344, 1873—GILL. Hymen. Fr. 387, 1874—KARST. Hattsv. I, 250, 1879.

Volvariopsis volvacea MURRILL, North Amer. Fl. X, 144, 1917.

Solitary or scattered. Pileus 5–10 cm. broad, campanulate, then expanded, obtuse; surface dry, fuliginous, darker at the center, densely covered with adpressed black or dark-brown fibrils, black when dry; context white, soft, floccose-fleshy; lamellae free, white at first, then flesh-colored, ventricose, attenuated toward both ends; stipe 5–12 cm. long, 5–10 mm. thick, slightly attenuated upward, white or yellowish, smooth, glabrous or white-downy-flocculose, solid; volva membranous, thin, ensheathing the base of the stipe, large, persistent, whitish or fuliginous, torn irregularly; spores pink in mass, ellipsoidal, smooth, $5–8 \times 3–5\,\mu$.

Hab. on the ground. Autumn. Ishikari (Nopporo, Sapporo).

Distr. Japan (Hokkaido, Honshu, Formosa), Europe, North America, Ceylon, China.

Jap. name. *Fukuro-take* (KAWAMUR,).

Sect. **Viscosae** SACC.

Fl. Ital. Crypt., Hymen. 514, 1915.

Pileus viscid, glabrous.

3. ***Volvaria speciosa*** (FR.) GILL.

Hymen. Fr. 388, 1874—KARST. Hattsv. I, 251, 1879—QUÉL. Ench. Fung. 54, 1886—SACC. Syll. Fung. V, 661, 1887; Fl. Ital. Crypt., Hymen. 515, 1915—SCHROET. Pilze Schles. I, 621, 1889—MASS. Brit. Fung. Fl. II, 295, 1893—W. G. SM. Brit. Basid. 98, 1908—ROLLAND, Atlas Champ. 56, f. 123, 1910—RICKEN, Blätterp. 274, pl. 70, f. 1, 1915—KAUFFM. Agar. Mich. 528, 1918—REA, Brit. Basid. 95, 1922—LANGE, Agar. Denm. VII, 3, 1928—BRES. Icon. Myc. XI, pl. 528, 1929.

[IMAI, Bot. Mag. (Tokyo), XLVII, 431, 1933]

Agaricus (Volvaria) speciosus FR. Syst. Myc. I, 278, 1821; Epicr. Myc. 139, 1838; Hymen. Eur. 183, 1874—RABENH. Deut. Krypt. Fl. I, 512, 1844—CKE. Handb. Brit. Fung. I, 85, 1871; Ill. Brit. Fung. pl. 297, 1886; Handb. Austr. Fung. 38, 1892—WINT. Die Pilze, I, 729, 1884.

Volvariopsis speciosa MURRILL, North Amer. Fl. X. 143, 1917.

Solitary. Pileus 6–8 cm. broad, globose, then campanulate, at length plane; surface whitish, grayish or drab, glabrous, viscid when wet, context white, taste and odour none; lamellae free, white, becoming pinkish or yellowish, attenuated to both ends, moderately crowded; stipe 10–12 cm. long, 8–20 mm. thick, equal or slightly attenuated upward, subbulbous at the base, white, covered with white powdery small scales, solid; volva large, white, membranous, edge deeply free and torn irregularly; spores pink in mass, ellipsoidal, 13.5–15.5 × 7–8.5 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido), Europe, North America, Australia.

Jap. name. *Shiro-fukuro-take* (IMAI).

4. *Volvaria gloiocephala* (DC. ex FR.) GILL.

Hymen. Fr. 387, 1874—QUÉL. Ench. Fung. 54, 1886—SACC. Syll. Fung. V, 662, 1887; Fl. Ital. Crypt., Hymen. 514, 1915—MASS. Brit. Fung. Fl. II, 295, 1893—W. G. SM. Brit. Basid. 98, 1908—ROLLAND, Atlas Champ. 57, f. 124, 1910—RICKEN, Blätterp. 272, pl. 70, f. 2, 1915—KAUFFM. Agar. Mich. 529, 1918—REA, Brit. Basid. 95, 1922—BRES. Icon. Myc. XI, pl. 529, 1929.

[IMAI, Bot. Mag. (Tokyo), XLVII, 432, 1933]

Agaricus gloiocephalus DC. Fl. Fr. VI, 52, 1815 (teste FR.).

Agaricus (Volvaria) gloiocephalus FR. Syst. Myc. I, 278, 1821; Epicr. Myc. 140, 1838; Hymen. Eur. 183, 1874—BARLA, Champ. Nice, 52, pl. 26, f. 1–8, 1859—CKE. Handb. Brit. Fung. I, 86, 1871; Ill. Brit. Fung. pl. 298, 1886—WINT. Die Pilze, I, 729, 1884.

Volvariopsis gloiocephala MURRILL, North Amer. Fl. X, 144, 1917.

Solitary. Pileus 7.5–12.5 cm. broad, campanulate, then expanded, becoming plane with a little umbo; surface slightly viscid, smooth, cinereous, densely covered with dark brown streaked adpressed fibrils, margin short striate; context fleshy, soft, silky-spongy, white, thick, but very thin at the margin, taste and odour none; lamellae free, white at first, then flesh color, ventricose, crowded, slightly serrulate at the edge; stipe 10–16 cm. long, 1–1.5 cm. thick, attenuated upward, subbulbous at the base, white, smooth and subglabrous at first, then villose and discolored, solid; volva membranous, rather thin, not large, white or yellowish, persistent, irregularly torn, ensheathing the base of stipe, villous outside; spores pink in mass, ellipsoidal, 10–14 × 6–8 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo, Sôunbetsu).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Africa, Australia.

Jap. name. *Ô-fukuro-take* (IMAI).

Pluteus FR. emend. QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 115, 1872.

Pluteus FR. Genera Hymen. 6, 1836, p. p.
Agaricus § *Pluteus* FR. Epicr. Myc. 140, 1838; Hymen. Eur. 185, 1874.
Rhodosporus § *Pluteus* SCHROET. Pilze Schles. I, 618, 1889.

Fructification without distinct universal and partial veils. Pileus fleshy, regular. Stipe central, fleshy or subfleshy, distinct and separable from the pileus. Lamellae free. Spores rose or pink in mass.

Type species: *Agaricus cervinus* SCHAEFF. ex FR.

Key to the sections and species in Hokkaido.

I. Pellicle of the pileus separating into fibrils or flocci...... Sect. Fibrillosi.
 A. Pileus *grayish or brownish, but darker at the center.*
  1. Pileus large; stipe white, covered with blackish fibrils; spores 6.5–7.5 × 5–6 μ .... *P. cervinus*(1).
  2. Pileus small; stipe whitish at first, then becoming white-azur-blue; spores 7.5–9 × 5–7 μ .... *P. salicinus*(2).
 B. Pileus white or whitish.
  1. Pileus large; spores large, 13.75–15.5 × 8–10 μ .... *P. macrosporus*(3).
  2. Pileus small to medium in size; spores 6–8 × 4.5–5.5 μ .... *P. pellitus*(4).
II. Pileus atomato-pruinose, somewhat pulverulent.......... Sect. Pruinosi.
 A. Pileus small, umber, covered with veined radiating wrinkles; stipe equal.. *P. nanus*(5).
 B. Pileus small, umber, without wrinkles, but shortly striate on the margin; stipe bulbous at the base.................. *P. bulbosus*(6).
III. Pileus naked, glabrous.................................. Sect. Nudi.
 A. Pileus yellow, lemon-yellow or vermilion............. *P. leoninus*(7).
 B. Pileus umber or dark cinnamon................. *P. phlebophorus*(8).

Sect. **Fibrillosi** IMAI, nom. nov.

Pilei cute in fibrillas vel floccos secedente.

1. *Pluteus cervinus* (SCHAEFF. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 115, 1872; Ench. Fung. 55, 1886—GILL. Hymen. Fr. 393, cum icone, 1874—KARST. Hattsv. I, 252, 1879—SACC. Syll. Fung. V, 665, 1887; Fl. Ital. Crypt., Hymen. 525, 1915—MASS. Brit. Fung. Fl. II, 284, 1893—ATKINS. Mushrooms, ed. 2, 138, f. 135, 1903—W. G. SM. Brit. Basid. 100, f. 23, 1908—ROLLAND, Atlas Champ. 57, f. 125, 1910—RICKEN, Blätterp. 276, pl. 71, f. 1, 1915—MURRILL, North Amer. Fl. X, 134, 1917—KAUFFM. Agar. Mich. 537, pl. 103, 1918—REA, Brit. Basid. 56, 1922—BRES. Icon. Myc. XI, pl. 534, 1929.

Agaricus cervinus SCHAEFF. Fung. Bavar. IV, Ind. 6, pl. 10, 1774 (teste FR.).

Agaricus lividus BULL. Champ. Fr. pl. 382, 1787 (teste FR.).

Agaricus latus BOLT. Hist. Fung. Halif. 2, pl. 2, 1788 (teste FR.)—SOW. Engl. Fung. pl. 108, 1797.

Agaricus pluteus PERS. Syn. Fung. 357, 1801 (teste FR.).

Agaricus (Clitopilus) Pluteus FR. Syst. Myc. I, 199, 1821—BERK. in SMITH, Engl. Fl. V, (2), 79, 1836.

Agaricus (Pluteus) cervinus FR. Epicr. Myc. 140, 1838; Hymen. Eur. 185, 1874—RABENH. Deut. Krypt. Fl. I, 511, 1844—BERK. Outl. Brit. Fung. 141, 1860—KICKX, Fl. Crypt. Flandr. II, 161, 1867—CKE. Handb. Brit. Fung. I, 87, 1871; Ill. Brit. Fung. pl. 301, 1886; Handb. Austr. Fung. 38, 1892—WINT. Die Pilze, I, 728, 1884.

Rhodosporus (Pluteus) cervinus SCHROET. Pilze Schles. I, 620, 1889.

Solitary, edible. Pileus 5–9 cm. broad, campanulate to nearly plane; surface avellaneous to subfuliginous, darker at the center, nearly smooth or with radiating fibrils or minute scales, slightly viscid when wet; context white, rather thin, soft, no taste; lamellae free, white at first, then pinkish or flesh colored, rounded behind, broad, crowded; stipe 6–12 cm. long, 6–12 mm. thick, equal, subbulbous at the base, white above, concolorous at the base, subglabrous, context white, solid, brittle; spores salmon-colored in mass, broadly ellipsoidal, smooth, $6.5–7.5 \times 5–6\ \mu$.

Hab. on the ground or on much decayed wood in woods. Summer to autumn. Ishikari (Sapporo, Mt. Teine, Mt. Moiwa, Jôzankei, Nopporo, Sôunbetsu), Iburi (Chitose, Lake side of Shikotsu), Oshima (Ônomura), Kushiro (Lake side of Akan), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America, Australia.

Jap. name. *Shikatake* (IMAI).

2. *Pluteus salicinus* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. in I, Mém. Soc. D'Emul. Montb. 2 sér. V, 115, 1872; Ench. Fung. 55, 1886—GILL. Hymen. Fr. 393, 1874—KARST. Hattsv. I, 254,

1879—SACC. Syll. Fung. V, 668, 1887—MASS. Brit. Fung. Fl. II, 286, 1893—W. G. SM. Brit. Basid. 101, 1908—RICKEN, Blätterp. 280, pl. 70, f. 5, 1915—KAUFFM. Agar. Mich. 539, 1918—REA, Brit. Basid. 59, 1922.

Agaricus salicinus PERS. Icon. Descr. Fung. I, 9, 1798; Syn. Fung. 344, 1801 (teste FR.).

Agaricus (*Leptonia*) *salicinus* FR. Syst. Myc. I, 202, 1821.

Agaricus (*Pluteus*) *salicinus* FR. Epicr. Myc. 141, 1838; Hymen. Eur. 186, 1874—RABENH. Deut. Krypt. Fl. I, 511, 1844—WINT. Die Pilze, I, 727, 1884—CKE. Ill. Brit. Fung. pl. 1169, f. A, 1891.

Rhodosporus (*Pluteus*) *salicinus* SCHROET. Pilze Schles. I, 620, 1889.

Solitary or in small clusters. Pileus 2–5 cm. broad, convex to expanded, broadly umbonate; surface bluish-gray, then cinereous or smoky-umber, darker at the disc, pruinose-velvety, (sometimes floccose-rugulose), disc flocculose, margin subglabrous and slightly striate; context white, tinged with green; lamellae free, rather close, white at first, then flesh-colored, edge concolorous; stipe 2–5 cm. long, 2–6 mm. thick, nearly equal, often enlarged at the base, usually curved, whitish at first, soon or then becoming white-azure-blue, shining, fragile, stuffed; spores flesh-colored in mass, broadly ellipsoidal, smooth, 7.5–9 × 5–7 μ; cystidia fusoid, hyaline, 2–4-prolonged at the apex, stout.

Hab. on decaying deciduous wood in woods. Summer. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Birôdo-benihidatake* (n. n.).

Our fungus may be a form of this species, because the pileus is pruinose-velvety and not flocculose-rugulose which has been stated by many authors. It, however, is identical in habit with the typical species in all other respects.

3. *Pluteus macrosporus* IMAI, sp. nov.

Solitarius. Pileo circa 8 cm. lato, subconico, dein umbonato, sicco, levi, sericeo-fibrilloso, albido vel disco fumoso, margine albo, integri vel leviter sulcato; carne albida, molli, crassa; lamellis liberis, primo albis, dein roseis, distantibus, acie leviter serrulatis; stipite usque ad 15 cm. longo, 1 cm. crasso, sursum attenuato, albido, supra floccoso, subtus fibroso vel floccoso, solido; sporis in cumulo roseis, ellipsoideis, levibus, 13.75–15.5 × 8–10 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Shiro-benihidatake* (n. n.).

The present fungus somewhat resembles *P. cervinus* f. *albus* from which it is easily distinguished by the larger spores.

4. *Pluteus pellitus* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 115, pl. 5, f. 4, 1872; Ench. Fung. 56, 1886—GILL. Hymen. Fr. 392, cum icone, 1874—KARST. Hattsv. I, 255, 1879—SACC. Syll. Fung. V, 668, 1887; Fl. Ital. Crypt., Hymen. 522, 1915—MASS. Brit. Fung. Fl. II, 287, 1893—W. G. SM. Brit. Basid. 101, 1908—RICKEN, Blätterp. 277, pl. 71, f. 2, 1915—REA, Brit. Basid. 59, 1922—BRES. Icon. Myc. XI, pl. 536, 1929.

Agaricus pellitus PERS. Syn. Fung. 366, 1801 (teste FR.).

Agaricus (Clitopilus) pellitus FR. Syst. Myc. I, 198, 1821.

Agaricus (Pluteus) pellitus FR. Epicr. Myc. 141, 1838; Hymen. Eur. 187, 1874—RABENH. Deut. Krypt. Fl. I, 511, 1844—WINT. Die Pilze, I, 727, 1884—CKE. Ill. Brit. Fung. pl. 597, 1886.

Rhodosporus (Pluteus) pellitus SCHROET. Pilze Schles. I, 619, 1889.

Solitary. Pileus 2–5 cm. or more broad, convex, then expanded to plane or subumbonate; surface smooth, somewhat dry or somewhat viscid, white, at length becomes slightly dingy, perhaps because of the spores, with separable silky shining pellicle; context white, soft, odour faint, taste none; lamellae free, 8 mm. broad, rather long remain white, then flesh color, crowded, rather rounded or broader behind, ventricose; stipe 4–12 cm. long, 4–8 mm. thick, slightly attenuated upward, slightly enlarged at the base, often curved, white, silky shining, subfloccose, striate (not smooth nor glabrous), fragile, solid; spores flesh-colored in mass, broadly ellipsoidal, smooth, $6–8 \times 4.5–5.5\ \mu$; cystidia fusoid, apex 2–3-corniculate.

Hab. on trunk of *Ulmus*. Late summer to autumn. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido), Asia Minor, Europe.

Jap. name. *Hana-yome-take* (n. n.).

Sect. Pruinosi IMAI, nom. nov.

Pileus atomato-pruinosus, subpulverulentus.

5. *Pluteus nanus* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 116, 1872; Ench. Fung. 56, 1886—GILL. Hymen. Fr. 394, 1874—KARST. Hattsv. I, 256, 1879

—SACC. Syll. Fung. V, 672, 1887; Fl. Ital. Crypt., Hymen. 527, 1915—MASS. Brit. Fung. Fl. II, 287, 1893—W. G. SM. Brit. Basid. 101, 1908—RICKEN, Blätterp. 279, pl. 70, f. 6, 1915—KAUFFM. Agar. Mich. 542, 1918—REA, Brit. Basid. 60, 1922—BRES. Icon. Myc. XI, pl. 542, f. 2, 1929.

Agaricus nanus PERS. Syn. Fung. 357, 1801 (teste FR.).

Agaricus (Clitopilus) nanus FR. Syst. Myc. I, 200, 1821.

Agaricus (Pluteus) nanus FR. Epicr. Myc. 141, 1838; Hymen. Eur. 187, 1874—RABENH. Deut. Krypt. Fl. I, 511, 1844—BERK. Outl. Brit. Fung. 141, 1860—CKE. Handb. Brit. Fung. I, 88, 1871; Ill. Brit. Fung. pl. 305, 1886—WINT. Die Pilze, I, 726, 1884.

Rhodosporus (Pluteus) pyrrhospermus SCHROET. Pilze Schles. I, 619, 1889.

Solitary or scattered. Pileus 2–3 cm. or more broad, hemispherical or convex, then expanded, applanato-umbonate, obtuse; surface at first light seal-brown, bone-brown or clove-brown, then Rood's-brown (fuliginous or umber), velvety-pruinose, granulose or pulverulent, covered with veined, radiating wrinkles on the center; context white, thin; lamellae free, white at first, then flesh-color, ventricose, edge white-fimbriate; stipe 2–4 cm. or more long, 2–4 mm. or more thick, nearly equal or slightly attenuated upward, whitish, slightly striate, slightly besprinkled with brown colored powders, rigid, solid; spores flesh-colored in mass, subglobose or broadly ellipsoidal, smooth, 5–7.5 × 5–6 μ; sterile cells on edge of lamellae obovate, hyaline.

Hab. on the ground or on decaying logs, sticks, etc., under trees. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe, North America, Australia, Asia Minor.

Jap. name. *Hime-benihida-take* (n. n.).

Our fungus is identical in size with *P. nanus* f. *minor* BRES. which was illustrated in BRESADOLA's Iconographia Mycologica.

6. *Pluteus bulbosus* IMAI, sp. nov.

Subgregarius. Pileo 3–5 cm. lato, e convexo plano, anguste depresso, umbrino ("dresden-brown", "Saccardo's umber" or "snuff-brown"), pruinoso, margine breve striatulo; carne alba, tenuissima; lamellis liberis, primo albis, dein carneis, ventricosis, utrimque attenuatis; stipite 4–7 cm. longo, 3–4 mm. crasso, deorsum incrassato basique bulboso, albido vel flavidulo, striato, glabro, basi pruinoso; sporis in cumulo carneis, globosis vel subglobosis, levibus, 6.5–7.5 μ.

Hab. on rotting wood in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Hotei-benihida-take* (n. n.).

The present species is allied to *P. nanus* from which it is easily distinguished by the even pileus and bulbous stipe. From *P. semibulbosus* (LASCH) GILL. the fungus is easily distinguishable by the darker pileus.

Sect. Nudi IMAI, nom. nov.

Pileus nudus, glabrus.

7. *Pluteus leoninus* (SCHAEFF. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 115, 1872; Ench. Fung. 56, 1886—GILL. Hymen. Fr. 396, cum icone, 1874—KARST. Hattsv. I, 257, 1879—SACC. Syll. Fung. V, 675, 1887; Fl. Ital. Crypt., Hymen. 530, 1915—MASS. Brit. Fung. Fl. II, 290, 1893—W. G. SM. Brit. Basid. 102, 1908—RICKEN, Blätterp. 278, pl. 71, f. 5, 1915—MURRILL, North Amer. Fl. X, 132, 1917—KAUFFM. Agar. Mich. 545, 1918—REA, Brit. Basid. 61, 1922—BRES. Icon. Myc. XI, pl. 541, 1929.

Agaricus leoninus SCHAEFF. Fung. Bavar. IV, Ind. 21, pl. 48, 1774—PERS. Icon. Descr. Fung. 22, pl. 7, f. 3–4, 1798; Syn. Fung. 337, 1801 (teste FR.).

Agaricus (*Clitopilus*) *leoninus* FR. Syst. Myc. I, 199, 1821—BERK. in SMITH, Engl. Fl. V, (2), 78, 1836.

Agaricus (*Pluteus*) *leoninus* FR. Epicr. Myc. 142, 1838; Hymen. Eur. 188, 1874—RABENH. Deut. Krypt. Fl. I, 510, 1844—BERK. Outl. Brit. Fung. 142, pl. 7, f. 4, 1860—CKE. Handb. Brit. Fung. I, 88, 1871; Ill. Brit. Fung. pl. 421, 1886—WINT. Die Pilze, I, 726, 1884.

Rhodosporus (*Pluteus*) *leoninus* SCHROET. Pilze Schles. I, 619, 1889.

Gregarious or caespitose. Pileus 2–7 cm. broad, campanulate or conical, then expanded, subumbonate, nearly plane; surface yellow, lemon-yellow, crimson-orange or vermilion, brighter in the younger stage, glabrous, nearly moist, scarcely striate on the margin at maturity; context, thin, fragile, whitish or yellowish, reddish under the pellicle in the vermilion specimen; lamellae free, white, then flesh-color, margin often light yellow, crowded, ventricose; stipe 3.5–7.5 cm. long, 3–10 mm. thick, equal or slightly attenuated upward, rarely compressed, whitish, light yellow, often nearly vermilion at the base, fragile, glabrous or fibrillose, longitudinally silky-striatulate, solid; spores flesh color in mass, subglobose to broadly ellipsoidal, 5–7 × 5–6 μ, smooth.

Hab. on decayed wood of deciduous trees. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America.

Jap. name. *Beni-hida-take* (n. n.).

8. *Pluteus phlebophorus* (DITM. ex FR.) GILL.

Hymen. Fr. 397, 1874—KARST. Hattsv. I, 257, 1879—QUÉL. Ench. Fung. 56, 1886—SACC. Syll. Fung. V, 676, 1887; Fl. Ital. Crypt., Hymen. 529, 1915—MASS. Brit. Fung. Fl. II, 291, 1893—W. G. SM. Brit. Basid. 102, 1908—RICKEN, Blätterp. 280, pl. 71, f. 6, 1915—REA, Brit. Basid. 61, 1922—BRES. Icon. Myc. XI, pl. 545, 1929.

Agaricus phlebophorus DITM. in STURM, Deut. Fl. III, 31, pl. 15, 1813.

Agaricus (Clitopilus) phlebophorus FR. Syst. Myc. I, 200, 1821—BERK. in SMITH, Engl. Fl. V, (2), 79, 1836.

Agaricus (Pluteus) phlebophorus FR. Epicr. Myc. 142, 1838; Hymen. Eur. 188, 1874—RABENH. Deut. Krypt. Fl. I, 516, 1844—BERK. Outl. Brit. Fung. 142, 1860—CKE. Handb. Brit. Fung. I, 89, 1871; Ill. Brit. Fung. pl. 422, f. A, 1886—WINT. Die Pilze, I, 725, 1884.

Solitary. Pileus 3–5 cm. broad, convex or subhemispherical, then expanded, subumbonate; surface umber, then dark-cinnamon, glabrous, wrinkled with black veins, center nearly even; context whitish, odour and taste none, fragile; lamellae free, crowded, ventricose, rather broad, white, then flesh color; stipe 3–6 cm. long, 4–5 mm. thick, subcylindrical, slightly enlarged below, sometimes incurved, white, glabrous, silky-shining, fistulose below; spores flesh color in mass, subglobose or broadly ellipsoidal, 6–7 μ or 6–8 × 6–7 μ, smooth.

Hab. on rotten wood in woods. Summer. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe.

Jap. name. *Ko-shiwa-beni-hidatake* (n. n.).

Tribe Entolomateae IMAI, nom. nov.

Entolomées KONRAD et MAUBL. Icon. Sel. Fung. 28 & 207, 1924–35, p. p.

Velum nullum distinctum. Pileus a stipite carnosi confluentus homogeneusque. Lamellae molles, stipite adhaerentes. Sporae in cumulo rosae.

Key to the genera.

1. Lamellae sinuate .... *Entoloma.*
2. Lamellae decurrent or adnate-decurrent by a tooth .... *Clitopilus.*

Entoloma (Fr.) Quél.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 116, 1872.

Agaricus § *Entoloma* Fr. Epicr. Myc. 143, 1838.
Rhodophyllus § *Entoloma* Quél. Ench. Fung. 57, 1886.
Hyporhodius § *Entoloma* Schroet. Pilze Schles. I, 616, 1889.

Fructification without volva and annulus. Pileus fleshy, regular or irregular. Stipe central, fibrous or fleshy. Lamellae sinuate, sinuato-adnate or adnexed. Spores pink in mass.

Type species: *Agaricus lividus* Bull. ex Fr.

Key to the sections and species in Hokkaido.

I. Pileus glabrous, moist or viscid, not hygrophanous .... Sect. Genuina.
  A. Pileus brownish-white, yellowish-white or grayish.
    1. Pileus large, not umbonate, avellaneous .... *E. lividum* (1).
    2. Pileus medium in size.
      a. Pileus yellowish-white or whitish, subumbonate .... *E. prunuloides* (2).
      b. Pileus brownish or grayish, venose-striate and virgate, not umbonate .... *E. erophilum* (3).
  B. Pileus dark-violet .... *E. subnitidum* (4).

II. Pileus floccose, subsquamulose, absolutely dry, not hygrophanous .... Sect. Leptonidea.
  1. Pileus small, vinaceous-purple .... *E. cyaneum* (5).

III. Pileus thin, hygrophanous, rather silky when dry, often irregular and repand .... Sect. Nolanidea.
  A. Stipe fibrous; pileus rather large, pinkish-buff to fuscous when wet, becoming pallid when dry, variegated with darker spots............. .... *E. clypeatum* (6).
  B. Stipe not fibrous.
    1. Odour farinaceous; pileus avellaneous to fuscous when wet...... .... *E. rhodopolium* (7).
    2. Odour strong, but not farinaceous; pileus fawn-cinereous........ .... *E. nidorosum* (8).

Sect. Genuina Fr.

Epicr. Myc. 143, 1838.

Pileus glabrous, moist or viscid, not hygrophanous, nor innato-floccose or squamulose.

1. *Entoloma lividum* (Bull. ex Fr.) Quél.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 116, pl. 6, f. 1, 1872—Gill. Hymen. Fr. 401, cum icone, 1874—Karst. Hattsv. I, 258, 1879—Sacc. Syll. Fung. V, 680, 1887; Fl. Ital. Crypt., Hymen. 535, 1915—Mass. Brit. Fung. Fl. II, 268, 1893—W. G. Sm. Brit. Basid. 103, 1908—Rolland, Atlas Champ. 58, f. 127, 1910—Ricken, Blätterp. 284, pl. 72, f. 2, 1915—Kauffm. Agar. Mich. 548, 1918—Rea, Brit. Basid. 243, 1922.

Agaricus lividus Bull. Champ. Fr. pl. 382, 1791 (teste Fr.).

Agaricus (Entoloma) lividus Fr. Monogr. Hymen. Suec. I, 269, 1857; Hymen. Eur. 189, 1874—Cke. Ill. Brit. Fung. pl. 311, 1886—Wint. Die Pilze, I, 725, 1884.

Rhodophyllus (Entoloma) lividus Quél. Ench. Fung. 57, 1886—Lange, Agar. Denm. IV, 29, 1921.

Hyporhodius (Entoloma) lividus Schroet. Pilze Schles. I, 617, 1889.

Solitary or gregarious, said to be poisonous. Pileus 5–16 cm. broad, convex then plane, somewhat gibbous; surface smooth, glabrous, silky shining, nearly avellaneous, slightly viscid when wet; context white, rather thin, brittle, odour farinaceous, taste mild; lamellae adnexed, rounded behind, somewhat free, white, then flesh color, attenuated in front, up to 13 mm. wide, distant; stipe 8–13 cm. long, 8–30 mm. thick, equal, shining white, apex faintly pruinose, slightly striate, nearly elastic, sometimes sulcate; spores pink in mass, globose or ellipsoidal, angular, $7.5–10 \times 7.5\ \mu$.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Nise-shimeji* (Kawamura).

2. *Entoloma prunuloides* (Fr.) Quél.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 117, 1872—Gill. Hymen. Fr. 400, cum icone, 1874—Karst. Hattsv. I, 259, 1879—Sacc. Syll. Fung. V, 680, 1887; Fl. Ital. Crypt., Hymen. 536, 1915—Mass. Brit.

Fung. Fl. II, 269, 1893—W. G. SM. Brit. Basid. 104, 1908—RICKEN, Blätterp. 285, 1915—REA, Brit. Basid. 244, 1922—BRES. Icon. Myc. XI, pl. 548, f. 2, 1929.

[YASUDA, Bot. Mag. (Tokyo), XXXVII, (208), 1923]

Agaricus (Clitopilus) Prunuloides FR. Syst. Myc. I, 198, 1821.

Agaricus (Entoloma) prunuloides FR. Epicr. Myc. 143, 1838; Hymen. Eur. 189, 1874—BERK. Outl. Brit. Fung. 143, 1860—CKE. Handb. Brit. Fung. I, 90, 1871—WINT. Die Pilze, I, 724, 1884.

Rhodophyllus (Entoloma) prunuloides QUÉL. Ench. Fung. 57, 1886—LANGE, Agar. Denm. IV, 30, 1921.

Solitary. Pileus 5–8 cm. broad, campanulate, then convex to plane, finally depressed around the little umbo, subumbonate; surface whitish or faintly yellowish, smooth, silky shining, almost glabrous but appears slightly silky fibrillose, slightly viscid when wet, margin entire or slightly waved or lobed, incurved, concolorous; context white, rather thin, taste mild, odour farinaceous; lamellae sinuate, somewhat free, whitish at first, then salmon-color, slightly waved on the edge, not entire, tapering in front, distant; stipe 5–10 cm. long, 5–8 mm. thick, subequal, narrowed at the base, concolorous or whitish, slightly flocculose or fibrous external, slightly shining, floccose or villous at the base, hollow or loosely stuffed; spores onion-skin-pink or Japan-pink in mass, globosely ovoid or subellipsoidal, obtusely angular, 8–10 × 7–8 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe.

Jap. name. *Ko-ippon-shimeji* (YASUDA).

3. *Entoloma erophilum* (FR.) KARST.

Hattsv. I, 259, 1879—SACC. Syll. Fung. V, 681, 1887; Fl. Ital. Crypt., Hymen. 533, 1915—W. G. SM. Brit. Basid. 104, 1908—RICKEN, Blätterp. 284, 1915—REA, Brit. Basid. 244, 1922—BRES. Icon. Myc. XI, pl. 547, 1929.

Agaricus (Entoloma) erophilus FR. Hymen. Eur. 190, 1874.

Solitary. Pileus 2–4 cm. broad, convex, then expanded, obtuse; surface glabrous, yellowish-gray, slightly viscid when wet, venosely striate and virgate, margin involute; context white, thin, slightly fleshy; lamellae adnate, adnate-subsinuate or adnate-subdecurrent, grayish, then flesh color, wide, distant; stipe 3–5 cm. long, 4–6 mm. thick, equal, white, becoming grayish, silky fibrous external, stuffed,

then nearly hollow; spores flesh color in mass, angular, subglobose or broadly oblong, 8–10 × 7.5–8 μ.

Hab. on the ground in woods. Autumn. Kitami (Oketo forest).

Distr. Japan (Hokkaido), Siberia, Europe.

Jap. name. *Hime-ippon-shimeji* (n. n.).

4. *Entoloma subnitidum* IMAI, sp. nov.

Solitarium vel gregarium. Pileo 4–7 cm. lato, conico vel convexo, dein expanso, subumbonato, violaceo-atrocyaneo ("dusky-violet" or "dusky-blue-violet"), asperulato vel velutinullo, sicco; carne ablida; lamellis sinuato-adnexis, albis dein carneis, distantibus, latis, ventricosis; stipite 7–10 cm. longo, 4–7 mm. crasso, equali, basi subincrassato, concolori vel pallidiori, sursum pruinoso, deorsum fibrilloso; sporis in cumulo carneis, ellipsoideis vel obovatis, tuberculosis vel angulatis, 10–12.5 × 7.5–10 μ.

Hab. on the ground in woods. Late summer to autumn. Ishikari (Nopporo), Kitami (Oketo forest).

Distr. Endemic.

Jap. name. *Murasaki-ipponshimeji* (n. n.).

The present fungus is closely allied to *E. nitidum* QUÉL. and *E. madidum* (FR.) GILL. It, however, is quite distinguishable from these species by the ellipsoidal spores.

Sect. Leptonidea FR.

Epicr. Myc. 145, 1838.

Pileus floccose, subsquarrose, absolutely dry, not hygrophanous.

5. *Entoloma cyaneum* (PK.) SACC.

Syll. Fung. V, 692, 1887—KAUFFM. Agar. Mich. 551, 1918.
Agaricus cyaneus PK. Bull. Buffalo Soc. Nat. Sci. I, 49, 1873.
Entoloma violaceum MURRILL, North Amer. Fl. X, 115, 1917.

Solitary or gregarious. Pileus 2–3.5 cm. broad, convex, then umbonate; surface dry, vinaceous-drab, deep-purplish-vinaceous, vinaceous-purple or mars-violet, minutely squamulose or powdery-

squamulose; context white, purplish under pellicle, thin; lamellae sinuate, whitish then tinged with pink, moderately crowded; stipe 3.5–6 cm. long, 2–4 mm. thick, equal or slightly enlarged at the base, paler than the pileus (rhodonite-pink), nearly whitish at both ends, powdery-squamulose, hollow; spores pink in mass, angular, obovate or subellipsoidal, 8.5–10 × 6.5–7.5 μ.

Hab. on humus ground in woods. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), North America.

Jap. name. *Ko-murasaki-ippon* (n. n.).

Sect. Nolanidea Fr.

Epicr. Myc. 146, 1838.

Pileus thin, hygrophanous, rather silky when dry, often irregular and repand.

6. *Entoloma clypeatum* (L. ex Fr.) Quél.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 118, 1872—Gill. Hymen. Fr. 402, cum icone, 1874—Karst. Hattsv. I, 265, 1879—Sacc. Syll. Fung. V, 694, 1887; Fl. Ital. Crypt., Hymen. 541, 1915—Mass. Brit. Fung. Fl. II, 278, 1893—W. G. Sm. Brit. Basid. 107, 1908—Rolland, Atlas Champ. 58, f. 129, 1910—Ricken, Blätterp. 287, pl. 73, f. 1, 1915—Kauffm. Agar. Mich. 552, 1918—Rea, Brit. Basid. 249, 1922—Bres. Icon. Myc. XII, pl. 558, 1929.

[Matsuura, Trans. Tottori Soc. Agr. Sci. IV, 96, 1932]

Agaricus clypeatus L. Sp. Pl. 1174, 1753 (teste Fr.).

Agaricus (*Entoloma*) *clypeatus* Fr. Epicr. Myc. 146, 1838; Hymen. Eur. 194, 1874—Rabenh. Deut. Krypt. Fl. I, 509, 1844—Berk. Outl. Brit. Fung. 144, pl. 7, f. 6, 1860—Kickx, Fl. Crypt. Flandr. II, 162, 1867—Cke. Handb. Brit. Fung. I, 93, 1871; Ill. Brit. Fung. pl. 319, 1886—Wint. Die Pilze, I, 721, 1884.

Rhodophyllus (*Entoloma*) *clypeatus* Quél. Ench. Fung. 59, 1886—Lange, Agar. Denm. IV, 30, 1921.

Hyporhodius (*Entoloma*) *clypeatus* Schroet. Pilze Schles. I, 616, 1889.

Gregarious or caespitose, edible. Pileus 2–10 cm. broad, convex, then umbonate; surface snuff-brown or drab color, usually streaked with fine ashy colored lines at the periphery, or irregularly variegated or spotted with ashy and hair-brown color on the center, glabrous, slightly viscid when wet, hygrophanous, margin spreading,

sometimes shortly striate; context white, rather thin, taste mild, odour mealy; lamellae obtusely adnate or sinuate, white, then dingy-flesh color, broad, subdistant; Stipe 3–11 cm. long, 4–20 mm. thick, equal or slightly thickened at the base, pallid or white, becoming grayish, with grey fibrils, fragile, stuffed or hollow; spores pink in mass, subglobose, coarsely warted or angular, 7.5–11 μ or 7.5–11 × 7–10 μ.

Hab. on the ground among the grass in woods or under trees. Spring. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Shimeji-modoki* (MATSUURA).

7. *Entoloma rhodopolium* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 246, 1872 —GILL. Hymen. Fr. 403, cum icone, 1874—KARST. Hattsv. I, 265, 1879—SACC. Syll. Fung. V, 694, 1887; Fl. Ital. Crypt., Hymen. 540, 1915—MASS. Brit. Fung. Fl. II, 279, 1893—W. G. SM. Brit. Basid. 107, 1908—ROLLAND, Atlas Champ. 58, f. 128, 1910—RICKEN, Blätterp. 287, pl. 73, f. 2, 1915—MURRILL, North Amer. Fl. X, 122, 1917—KAUFFM. Agar. Mich. 553, pl. 105, 1918—REA, Brit. Basid. 250, 1922—KAWAMURA, Ill. Jap. Fung. pl. 18, f. 6–8, 1925—BRES. Icon. Myc. XII, pl. 560, 1929.

Agaricus (Clitopilus) rhodopolius FR. Syst. Myc. I, 197, 1821.

Agaricus (Entoloma) rhodopolius FR. Epicr. Myc. 147, 1838; Hymen. Eur. 195, 1874—RABENH. Deut. Krypt. Fl. I, 509, 1844—BERK. Outl. Brit. Fung. 145, 1860—CKE. Handb. Brit. Fung. I, 94, 1871; Ill. Brit. Fung. pl. 342, 1886—WINT. Die Pilze, I, 721, 1884.

Rhodophyllus (Entoloma) rhodopolius QUÉL. Ench. Fung. 59, 1886—LANGE, Agar. Denm. IV, 30, 1921.

Hyporhodius (Entoloma) hydrogrammus SCHROET. Pilze Schles. I, 616, 1889.

Solitary. Pileus 3–8 cm. broad, campanulate, then expanded and subumbonate or gibbous, at length somewhat plane, and sometimes depressed; surface avellaneous to fuscous, becoming pale, isabelline-livid, silky-shining when dry, fibrillose when young, then smooth, hygrophanous, margin incurved, undulate when large specimen, sometimes lobed; context white, dark under the pellicle, taste mild, odour mealy; lamellae adnexed, then separating, somewhat sinuate, white, then rose color, rather narrow, distant; stipe 5–10 cm. long, 0.5–1.5 cm. thick, equal or attenuated upward, slightly striate, apex white-

pruinose, white or whitish, hollow; spores pink in mass, subglobose or globose, angular, 8–9 × 7–8 μ or 7–9 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America.

Jap. name. *Kusa-urabenitake* (KAWAMURA).

8. *Entoloma nidorosum* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 119, 1872—GILL. Hymen. Fr. 402, 1874—KARST. Hattsv. I, 268, 1879—SACC. Syll. Fung. V, 697, 1887; Fl. Ital. Crypt., Hymen. 541, 1915—MASS. Brit. Fung. Fl. II, 282, 1893—W. G. SM. Brit. Basid. 108, 1908—RICKEN, Blätterp. 287, 1915—REA, Brit. Basid. 251, 1922—BRES. Icon. Myc. XII, pl. 563, 1929.

Agaricus (*Entoloma*) *nidorosus* FR. Epicr. Myc. 148, 1838; Hymen. Eur. 196, 1874—BERK. Outl. Brit. Fung. 145, 1860—CKE. Handb. Brit. Fung. I, 95, 1871; Ill. Brit. Fung. pl. 321, 1886—WINT. Die Pilze, I, 720, 1884.

Rhodophyllus (*Entoloma*) *nidorosus* QUÉL. Ench. Fung. 59, 1886—LANGE, Agar. Denm. IV, 31, 1921.

Solitary. Pileus 3–6 cm. broad, convex, then expanded, at length often concave, and irregularly shaped, rimose; surface fawn-cinereous, livid, hygrophanous, silky shining when dry; context white, odour strong, taste mild; lamellae emarginate-free, pallid, then flesh-color, distant, sometimes undulate-flexuous; stipe 5–10 cm. long, 3–10 mm. thick, equal or attenuated upward, whitish, glabrous, white-pruinose at the apex; spores pink in mass, angular, subglobose, 8–10 × 7–9 μ.

Hab. on the ground in woods. Late summer to autumn. Kitami (Oketo forest).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Ko-kusaurabenitake* (n. n.).

Clitopilus (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 120, 1872.

Pleuropus REUSSEL, Fl. Calvados, ed. 2, 67, 1806—MURRILL, North Am. Fl. X, 102, 1917.

Agaricus § *Clitopilus* FR. Syst. Myc. I, 10 & 194, 1821, p. p.; Epicr. Myc. 148, 1838.
Rhodosporus § *Clitopilus* SCHROET. Pilze Schles. I, 618, 1889.
Hexajuga FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 389, 1889.

Fructification without volva and annulus. Pileus fleshy, regular or irregular. Stipe central or rarely subexcentric, fleshy. Lamellae decurrent. Spores pink in mass.

Type species: *Agaricus prunulus* SCOP. ex FR.

1. *Clitopilus caespitosus* PK.

41 Ann. Rept. N. Y. State Mus. 65, 1888—KAUFFM. Agar. Mich. 570, pl. 112–113, 1918.
Pleuropus caespitosus MURRILL, North Amer. Fl. X, 104, 1917.

Caespitose, edible. Pileus 2.5–10 cm. broad, at first convex, soon expanded and plane, finally depressed at the center; surface glabrous, whitish to grayish when young, then becoming watery-dingy-white when wet, dull whitish to pale tan and silky shining when dry, even, margin at first incurved, often recurved and split in age; context white to pallid, thin, somewhat firm, but brittle, fragile, taste mild, odour slightly fragrant; lamellae adnate-decurrent or sinuate-decurrent, thin, very crowded, whitish, then dingy-pale fleshy-color, edge sometimes minutely crenulate; stipe 2.5–7 cm. long, 3–8 mm. thick, equal or attenuated upward, rarely downward, silky-fibrillose, scurfy at apex, pallid, stuffed, fragile in age, easily splitting; spores sordid white with a pink tinge in mass (very pale pink), short oblong, smooth, $6 \times 4\,\mu$.

Hab. on the ground under trees. Late summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), North America.

Jap. name. *Kabu-urabenitake* (n. n.).

2. *Clitopilus abortivus* (BERK. et CURT.) SACC.

Syll. Fung. V, 701, 1887—KAUFFM. Agar. Mich. 564, pl. 111, 1918.
Agaricus (Clitopilus) abortivus BERK. et CURT. Ann. Mag. Nat. Hist. 3 ser. IV, 289, 1859.
Pleuropus abortivus MURRILL, Mycologia, III, 280, 1911; Ibid. IV, 6, pl. 56, f. 12, 1912; North Amer. Fl. X, 108, 1917.

Solitary, gregarious or subcaespitose, usually growing with an imperfectly developed subglobose, whitish, sterile mass of mycelium, edible. Pileus 3–10 cm. broad, convex, then nearly plane to subdepressed, regular or irregular; surface dry, at first covered with a delicate silky tomentum, glabrescent, gray or grayish-brown (light-drab), dull, becoming isabelline, margin even; context white, odour and taste farinaceous; lamellae decurrent or adnate with a decurrent tooth, thin, crowded, whitish or pale grayish, changing to rosy or salmon-color, rather narrow; stipe 3–9 cm. long, 4–10 mm. thick, subequal, subconcolorous or paler than the pileus, slightly flocculose, sometimes fibrous-striate, solid; spores salmon-pink in mass, elongated angular, irregular, 8–10 × 5–7 μ.

Hab. on the ground or old prostrate trunks of trees in woods and open places. Autumn. Ishikari (Nopporo), Iburi (Chitose, Lake side of Shikotsu).

Distr. Japan (Hokkaido), North America.

Jap. name. *Tama-urabenitake* (n. n.).

Tribe **Claudopeae** IMAI, nom. nov.

Vellum nullum distinctum. Pileus excenticus, lateralis vel resupinatus. Lamellae molles. Sporae in cumulo rosae vel roseo-rubiginosae.

Claudopus (W. G. SM.) GILL.

Hymen. Fr. 426, 1874.
Agaricus § *Claudopus* W. G. SM. in SEEM. Journ. Bot. VIII, 215, 1870.
Dochmiopus PAT. Hymen. Eur. 113, 1887.
Octojuga FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 390, 1889.

Fructification without universal and partial veils. Pileus fleshy, excentric, lateral or resupinate. Stipe excentric, lateral or wanting. Lamellae radiating from a central point or decurrent. Spores pink in mass.

Type species: *Agaricus variabilis* PERS. ex FR.

Claudopus nidulans (PERS. ex FR.) KARST.

Hattsv. I, 288, 1879—ATKINS. Mushrooms, ed. 2, 149, f. 144, 1903—MURRILL, North Amer. Fl. X, 79, 1917—KAUFFM. Agar. Mich. 591, pl. 115, 1918.

Agaricus nidulans PERS. Icon. Descr. Fung. 19, pl. 6, f. 4, 1798; Syn. Fung. 482, 1801 (teste FR.).

[YASUDA, Bot. Mag. (Tokyo), XXIX, (263), 1915]

Agaricus (Pleurotus) nidulans FR. Syst. Myc. I, 189, 1821; Epicr. Myc. 138, 1838; Hymen. Eur. 178, 1874—RABENH. Deut. Krypt. Fl. I, 514, 1844—WINT. Die Pilze, I, 732, 1884—SCHROET. Pilze Schles. I, 624, 1889.

Pleurotus nidulans GILL. Hymen. Fr. 384, 1874—SACC. Syll. Fung. V, 375, 1887; Fl. Ital. Crypt., Hymen. 311, 1915—RICKEN, Blätterp. 455, pl. 112, f. 6, 1915.

Crepidotus nidulans QUÉL. Ench. Fung. 108, 1886—REA, Brit. Basid. 454, 1922.

Panus nidulans PILÁT, Mykologia, VII, 90, 1930—MALKOV. Ann. Myc. XXX, 44, f. 13–16, 1932.

Gregarious or caespitose, sometimes imbricate, edible. Pileus 2–9 cm. broad, 1.5–5 cm. long, shelving, sessile or narrowed behind into a short stem-like base, nearly orbicular, dimidiate or reniform; surface coarsely hairy or tomentose, warm-buff, antimony-yellow or ochraceous-buff in color, margin inrolled, even or lobed and orange colored and more distinctly and long tomentose; context yellowish, becoming whitish when dry, rather thick, soft, odour pleasant; lamellae decurrent, light-ochraceous-buff, crowded, narrow; stipe short or lacking, stipe or attached base tomentose next to the lamellae beneath; spores pink in mass, elongated, slightly curved, 5–6 × 2.5–3.5 μ.

Hab. on decayed or dead wood of various trees in woods or gardens, etc. Summer to autumn. Ishikari (Sapporo, Jôzankei).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Ki-hiratake* (YASUDA).

Tribe **Leptonieae** IMAI, nom. nov.

Vellum nullum distinctum. Pileus cum stipite cartilagine confluentus sed a stipite heterogenus. Lamellae cum stipite adhaerentes vel liberae. Sporae in cumulo rosae.

Key to the genera.

I. Lamellae adnate or sinuate-adnate.
  1. Margin of pileus at first incurved or exceeding the lamellae.......... .... *Leptonia.*
  2. Margin of pileus straight, at first adpressed to the stipe............. .... *Nolanea.*

Leptonia (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 121, 1872.

Agaricus § *Leptonia* FR. Syst. Myc. I, 201, 1821.
Rhodophyllus § *Leptonia* QUÉL. Ench. Fung. 59, 1886.
Hyporhodius § *Leptonia* SCHROET. Pilze Schles. I, 614, 1889.
Leptoniella EARLE, Bull. N. Y. Bot. Gard. V, 424, 1909.

Fructification without universal and partial veils. Pileus slightly fleshy, regular, incurved at the margin. Stipe central, cartilaginous. Lamellae adnate, sinuato-adnate or adnexed. Spores pink in mass.

Type species: *Agaricus anatinus* LASCH.

Key to the species in Hokkaido.

I. Stipe not white nor yellow.
  1. Pileus blackish-blue, velvety-floccose; lamellae at first white; stipe dark blue.. *L. lampropus* (1).
  2. Pileus and stipe pale umber, almost glabrous; lamellae at first white... .... *L. umbrinella* (2).

II. Stipe white; pileus whitish or slightly ochraceous.......... *L. sericella* (3).

1. *Leptonia lampropus* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 121, 1872 —GILL. Hymen. Fr. 416, cum icone, 1874—KARST. Hattsv. I, 274, 1879—SACC. Syll. Fung. V, 707, 1887; Fl. Ital. Crypt., Hymen. 557, 1915 (ut *lampropoda*)—MASS. Brit. Fung. Fl. II, 251, 1893 (ut *lampropoda*)—W. G. SM. Brit. Basid. 112, 1908—RICKEN, Blätterp. 293, pl. 73, f. 7, 1915—KAUFFM. Agar. Mich. 574, 1918 (ut *lampropoda*)—REA, Brit. Basid. 344, 1922—BRES. Icon. Myc. XII, pl. 570, f. 1, 1929 (ut *lampropoda*).

Agaricus (*Leptonia*) *lampropus* FR. Syst. Myc. I, 203, 1821; Epicr. Myc. 152, 1838; Hymen. Eur. 202, 1874—BERK. Outl. Brit. Fung. 146, 1860—CKE. Handb. Brit. Fung. I, 99, 1871; Ill. Brit. Fung. pl. 331, 1886—WINT. Die Pilze, I, 715, 1884.

Rhodophyllus (Leptonia) lampropus QUÉL. Ench. Fung. 60, 1886—LANGE, Agar. Denm. IV, 33, 1921.

Hyporhodius (Leptonia) lampropus SCHROET. Pilze Schles. I, 615, 1889.

Gregarious or solitary. Pileus 1–3 cm. broad, convex, then plane, subumbilicate or depressed, not papilate; surface mouse-color or steel-blue, then fuliginous-gray, silky-flocculose, then becoming fuscous-squamulose, squamules dense in center, never striate, sometimes rimose, margin inflexed then raised; context at first bluish-black, then gray to white, subhygrophanous, thin, odour and taste none; lamellae adnate, readily separating, then free, subdistant, broad, ventricose, white, then flesh-color, edge entire and concolorous; stipe 2.5–5 cm. long, 2–4 mm. thick, equal or attenuated upward, azure-blue at first, becoming fuscous, commonly steel-blue-violaceous, glabrous, even, white floccose at the base, elastic, firm, stuffed then hollow; spores rosy in mass, variable in size, ellipsoidal, angular, 9–13 × 6–8 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Australia.

Jap. name. *Ao-e-no-momiuratake* (n. n.).

2. *Leptonia umbrinella* IMAI, sp. nov.

Solitaria. Pileo 1.5–5 cm. lato, convexo, demum leviter depresso, glabro, sicco, pallide umbrino, centro obscuriore, non striato, margine primo inflexo; carne tenera, cinerea, odore nullo; lamellis adnexis vel sinuatis, confertis, primo albidis, dein incarnatis; stipite 3–7 cm. longo, 2–4 mm. crasso, aequali vel basi leviter incrassato, subconcolori vel pallidiori, sericeo-fibrilloso, saepe flexuoso, cavo; sporis in cumulo roseis, angularibus, ellipsoideis vel oblongis, 10–12.5 × 7–10 μ.

Hab. on the ground in woods. Autumn. Ishikari (Mt. Kurodake).

Distr. Endemic.

Jap. name. *Cha-momiuratake* (n. n.).

The present fungus is somewhat allied to *L. solstitialis* (FR.) GILL. and *Eccilia polita* (FR.) QUÉL., but it is easily distinguished from the former species by the non-papillate pileus, and from the latter by the non-striate pileus and less attached lamellae.

3. *Leptonia sericella* (FR.) BARBIER.

Bull. Soc. Myc. Fr. XXVII, 178, 1911—RICKEN, Blätterp. 289, pl. 73, f. 4, 1915—REA, Brit. Basid. 346, 1922.

Agaricus (*Clitopilus*) *sericellus* FR. Syst. Myc. I, 196, 1821—BERK. in SMITH, Engl. Fl. V, (2), 76, 1836.

Agaricus (*Entoloma*) *sericellus* FR. Epicr. Myc. 146, 1838; Hymen. Eur. 194, 1874—BERK. Outl. Brit. Fung. 144, 1860—CKE. Handb. Brit. Fung. I, 93, 1871; Ill. Brit. Fung. pl. 307, 1886—WINT. Die Pilze, I, 722, 1884.

Entoloma sericellum QUÉL. Champ. Jura Vosg. I, *in* Mém. Soc. D'Emul. Montb. 2 sér. V, 118, pl. 5, f. 5, 1872—GILL. Hymen. Fr. 405, 1874—KARST. Hattsv. I, 264, 1879—SACC. Syll. Fung. V, 691, 1887; Fl. Ital. Crypt., Hymen. 537, 1915—MASS. Brit. Fung. Fl. II, 277, 1893—W. G. SM. Brit. Basid. 106, 1908—KAUFFM. Agar. Mich. 550, 1918—BRES. Icon. Myc. XII, pl. 557, 1929.

Rhodophyllus (*Leptonia*) *sericellus* QUÉL. Ench. Fung. 61, 1886—LANGE, Agar. Denm. IV, 34, 1921.

Gregarious. Pileus 1.5–3 cm. broad, convex, then plane, obtuse, at length depressed, often unequal; surface white or becoming yellowish-white, silky shining or minutely squamulose, margin inflexed, floccose; context white, thin, inodourous; lamellae at first adnate, slightly decurrent by a tooth, then separating and somewhat sinuate, rather distant, broad, white then flesh-colored; stipe 2–5 cm. long, 2–3 mm. thick, equal, cylindrical, shining, white, then becoming pale, subwaxy, fibrillose, at length somewhat polished, pellucid, subfistulose; spores flesh color in mass, angular, variable in shape and size, 9–10 μ in diam. or 9–11 × 6–8 μ.

Hab. on the ground in woods. Autumn. Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Kinu-momiuratake* (n. n.).

Nolanea (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 122, 1872.

Agaricus § *Nolanea* FR. Syst. Myc. I, 204, 1821.

Rhodophyllus § *Nolanea* QUÉL. Ench. Fung. 63, 1886.

Hyporhodius § *Nolanea* SCHROET. Pilze Schles. I, 613, 1889.

Fructification without volva and annulus. Pileus fleshy or submembranous, regular; margin straight, at first adpressed to the stipe. Stipe central, cartilaginous. Lamellae adnate, adnexed or sinuate-adnate. Spores pink in mass.

Type species: *Agaricus pascus* PERS. ex FR.

Nolanea mammosa (L. ? ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 122, 1872—GILL. Hymen. Fr. 419, cum icone, 1874—KARST. Hattsv. I, 281, 1879—SACC. Syll. Fung. V, 718, 1887; Fl. Ital. Crypt., Hymen. 564, 1915—MASS. Brit. Fung. Fl. II, 259, 1893—W. G. SM. Brit. Basid. 115, 1908—RICKEN, Blätterp. 299, pl. 74, f. 6, 1915—MURRILL, North Amer. Fl. X, 101, 1917—KAUFFM. Agar. Mich. 583, 1918—REA, Brit. Basid. 403, 1922—BRES. Icon. Myc. XII, pl. 582, 1929.

?*Agaricus mammosus* L. Sp. Pl. 1174, 1753 (teste FR.).

Agaricus (Nolanea) mammosus FR. Epicr. Myc. 156, 1838; Hymen. Eur. 207, 1874—WINT. Die Pilze, I, 710, 1884.

Rhodophyllus (Nolanea) mammosus QUÉL. Ench. Fung. 64, 1886—LANGE, Agar. Denm. IV, 36, 1921.

Hyporhodius (Nolanea) mammosus SCHROET. Pilze Schles. I, 614, 1889.

Solitary. Pileus 2–4 cm. broad, conical to broadly campanulate, papillate; surface hygrophanous, almost glabrous, olive-brown or bister when moist, paler and shining when dry, margin incurved, faintly striatulate; context thin, subconcolorous, odour none; lamellae sinuate, gray, then flesh-color, moderately crowded, edge uneven, ventricose; stipe 7–11 cm. long, 2–4 mm. thick, cylindrical, nearly equal, but slightly enlarged at the base, paler than the pileus (drab color), rigid, cartilaginous, fibrillose-striate, white-mealy at the apex, white tomentose at the base, otherwise glabrous, shining, fistulose; spores pink in mass, tuberculate-angular, 4–7-angulate-elongate, 8–12 × 6–7.5 μ.

Hab. among fallen leaves on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Momiura-modoki* (n. n.).

Explanation of Plate I

Fig. 1. *Amanita Caesarea* (SCOP. ex FR.) QUÉL.

Fig. 2. *Amanita subjunquillea* IMAI.

Fig. 3. *Amanita phalloides* (FR.) QUÉL.

Fig. 4. *Amanita mappa* (BATSCH ex FR.) QUÉL.

Fig. 5. *Amanita pantherina* (DC. ex FR.) QUÉL.

Fig. 6. *Amanita spissacea* IMAI.

Fig. 7. *Amanitopsis vaginata* (BULL. ex FR.) ROZE.

Fig. 8. *Amanitopsis clarisquamosa* IMAI.

Fig. 9. *Lepiota procera* (SCOP. ex FR.) QUÉL.

Fig. 10. *Lepiota subamanitiformis* IMAI.

Fig. 11. *Armillaria Matsutake* S. ITO et IMAI.
(from Notoro forest in Hokkaido)

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Explanation of Plate II

Fig. 1. *Armillaria ventricosa* PK.

Fig. 2. *Armillaria mellea* (VAHL ex FR.) QUÉL.

Fig. 3. *Cortinellus bulbiger* (ALB. et SCHW. ex FR.) GILL.

Fig. 4. *Tricholoma equestre* (L. ex FR.) QUÉL.

Fig. 5. *Tricholoma porphyrophyllum* IMAI.

Fig. 6. *Tricholoma humosum* (FR.) IMAI.

Fig. 7. *Tricholoma personatum* (FR.) QUÉL.

Fig. 8. *Tricholoma ulmarium* (BULL. ex FR.) KARST.

Fig. 9. *Clitocybe extenuata* (FR.) IMAI.

Fig. 10. *Armillaria japonica* (KAWAMURA) IMAI.

Plate II.

Explanation of Plate III

Fig. 1. *Pleurotus cornucopiae* (PAUL. ex PERS.) ROLLAND.

Fig. 2. *Hygrophorus virgineus* FR.

Fig. 3. *Hygrophorus carnescens* IMAI.

Fig. 4. *Hygrophorus lucorus* KALCHBR.

Fig. 5. *Collybia radicata* (RELH. ex FR.) QUÉL.

Fig. 6. *Collybia esculenta* (WULF. ex FR.) QUÉL.

Fig. 7. *Hygrophorus subniveus* IMAI.

Fig. 8. *Volvaria bombycina* (SCHAEFF. ex FR.) QUÉL.

Fig. 9. *Volvaria speciosa* (FR.) GILL.

Fig. 10. *Volvaria gloiocephala* (DC. ex FR.) GILL.

Fig. 11. *Entoloma clypeatum* (L. ex FR.) QUÉL.

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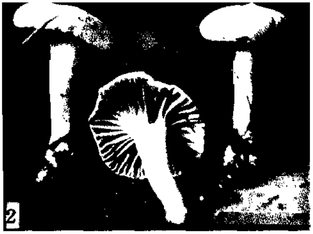

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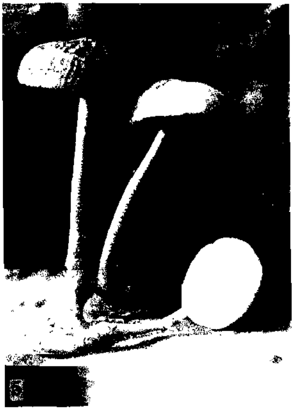

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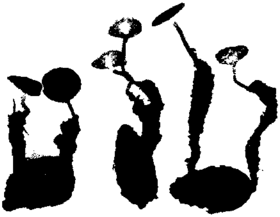

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STUDIES ON THE AGARICACEAE OF HOKKAIDO. II

By

Sanshi IMAI

Subfam. Pholiotoideae IMAI, nom. nov.

Cortinaria FR. Syst. Myc. I, 10, 1821.
Derminus FR. Ibid. 10, 1821.
Dermini FR. Epicr. Myc. 160, 1838.
Ochrosporées GILL. Hymen. Fr. 428, 1874.
Phaeospori QUÉL. Ench. Fung. 66, 1886.
Ochrosporae SACC. Syll. Fung. V, 735, 1887.
Pholiotanae MURRILL, North Amer. Fl. X, 145, 1917.

Trama floccosa, carnosa vel subcartilaginea, non vesiculosa; sporae in cumulo ochraceae vel subferrugineae.

Tribe Pholioteae IMAI, nom. nov.

Pholiotées KONR. et MAUBL. Icon. Sel. Fung. 28 & 102, 1924, p.p.

Fructificatio carnosa, annulata vel annulata subvolvataque. Pileus cum stipite carnosi confluentus et homogeneus. Lamellae molles, carnosae, cum stipite adhaerentes.

Key to the genera.

1. Fructification with subpersistent universal veil and annulus........ *Rozites*.
2. Fructification with annulus, and either without or with very fugacious universal veil..*Pholiota*.

Rozites KARST.

Hattsv. I, xx, 1879.

Agaricus § *Pholiota* Auct. plur. pro min. p.
Pholiota Auct. plur. pro min. p.
Dryophila § *Pholiota* QUÉL. Ench. Fung. 66, 1886, pro min. p.
Togaria W. G. SM. Brit. Basid. 121, 1908, pro min. p.

[Jour. Facul. Agr., Hokkaido Imp. Univ., Sapporo, Vol. XLIII, Pt. 2, August, 1938]

Fructification with a subpersistent universal veil and a membranous annulus. Pileus fleshy, regular, confluent and homogeneous with the fleshy stipe. Stipe central, fleshy. Universal veil often cohering in the form of a volva at the base of stipe and remaining as a floccose-powder on the pileus. Partial veil remaining as a membranous, persistent annulus. Lamellae attached to the stipe, fleshy, soft. Spores ferruginous in mass.

Type species: *Agaricus caperatus* PERS. ex FR.

Rozites caperatus (PERS. ex FR.) KARST.

Hattsv. I, 290, 1879; Finl. Basid. 158, 1889—SCHROET. Pilze Schles. I, 612, 1889—REA, Brit. Basid. 111, 1922.

Agaricus caperatus PERS. Obs. Myc. I, 48, 1796; Syn. Fung. 273, 1801 (teste FR.).

Agaricus (Pholiota) caperatus FR. Syst. Myc. I, 241, 1821; Hymen. Eur. 215, 1874—BERK. in SMITH, Engl. Fl. V, (2), 90, 1836—WINT. Die Pilze, I, 704, 1884.

Cortinarius (Phlegmacium) caperatus FR. Epicr. Myc. 256, 1838—RABENH. Deut. Krypt. Fl. I, 502, 1844—BERK. Outl. Brit. Fung. 183, 1860—CKE. Handb. Brit. Fung. I, 172, 1871.

Pholiota caperata GILL. Hymen. Fr. 435, cum icone, 1874—SACC. Syll. Fung. V, 736, 1887; Fl. Ital. Crypt., Hymen. 676, 1916—MASS. Brit. Fung. Fl. II, 210, 1893—ROLLAND, Atlas Champ. 60, f. 132, 1910—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 476, pl. 24, 1913—KAWAMURA, Ill. Jap. Fung. pl. 9, f. 11–13, 1914—RICKEN, Blätterp. 197, pl. 55, f. 2, 1915—KAUFFM. Agar. Mich. 294, 1918—LANGE, Agar. Denm. IV, 5, 1921—OVERH. Ann. Mo. Bot. Gard. XIV, 123, pl. 13, 1927—BRES. Icon. Myc. XIV, pl. 683, 1930.

[SHIRAI, List Jap. Fung. ed. 2, 429, 1917; ed. 3, 258, 1927]

Dryophila (Pholiota) caperata QUÉL. Ench. Fung. 66, 1886.

Togaria caperata W. G. SM. Brit. Basid. 122, 1908.

Gregarious or solitary, edible. Pileus 4–15 cm. broad, hemispherical or ovate, then campanulate or convex to nearly plane, obtuse; surface ochraceous-buff to ochraceous-tawny, sometimes blackish at the center in dried plants, dry or moist, at first covered with adpressed white fibrils that give the pileus a gray appearance and may be more or less arranged in scales, finally more glabrous, especially on the margin, and then likely to be considerably wrinkled and corrugate, margin even, at first incurved and often veiled; context white or yellowish, taste mild; lamellae sinuate-adnate or adnate to slightly decurrent, crowded, at first whitish, then clay-colored, finally ferruginous, becoming cinnamon in dried plants, usually

variegated with close, narrow, light and dark cross-bands and appearing transversely wrinkled, the edge floccose-crenate; stipe 6–15 cm. long, 7–25 mm. thick, equal, white or slightly yellowish, floccose-tomentose above the annulus, glabrous or slightly fibrillose below, sometimes with a definite submembranous remain of the universal veil at the base, solid; annulus forming a persistent, superior or almost median, white or yellowish, deflexed, membranous annulus, sometimes striate on the upper side; spores ferruginous in mass, broadly and inequilaterally ellipsoidal, echinulate, 11–19 × 7–11 μ; cystidia none.

Hab. on the ground in woods. Autumn. Iburi (Lake side of Shikotsu), Shiribeshi (Zenibako), Ishikari (Nopporo), Kitami (Oketo), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Shôunji* (KAWAMURA).

Pholiota (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 124, 1872.

Agaricus § *Pholiota* FR. Syst. Myc. I, 240, 1821.
Pholiotina FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 357, 1889.
Dryophila § *Pholiota* QUÉL. Ench. Fung. 66, 1886.
Togaria W. G. SM. Brit. Basid. 121, 1908.
Pholiotopsis EARLE, Bull. N. Y. Bot. Gard. V, 443, 1909.

Fructification with a membranous annulus. Pileus fleshy, regular, confluent and homogeneous with a fleshy stipe. Stipe central, fleshy. Universal veil none or very fugacious. Partial veil remaining as a membranous, persistent or subpersistent annulus. Lamellae attached to the stipe, fleshy, soft. Spores ochraceous, ferruginous or dull brown in mass.

Type species: *Agaricus durus* BOLT. ex FR.

Key to the sections, subsections and species in Hokkaido.

I. Fructification growing on the ground .... Sect. Humigenae.
  A. Pileus with a powdery bloom .... Subsect. Velatae.
    1. Pileus warm-buff to dingy gold-yellow, densely covered with friable powders .... *P. Vahlii* (1).

B. Pileus smooth, naked.............................. Subsect. Nudae.
  1. Spores ferruginous in mass......................... Euderminae.
    a. Cystidia none; spores truncate at the apex; pileus watery-brown when fresh, ochraceous when dry.
      i. Spores 6.5–9 μ long...................... *P. blattaria* (2).
      ii. Spores 9–10.5 μ long.................... *P. Arrhenii* (3).
  2. Spores dull brown in mass........................... Phaeotae.
    a. Spores truncate at the apex; pileus whitish or yellowish...... .... *P. praecox* (4).
    b. Spores not truncate.
      i. Pileus 1–5 cm. broad, at first brown or blackish-brown, then ochraceous-tawny, viscid when moist; annulus superior, or apical............................... *P. erebia* (5).
      ii. Pileus 4–10 cm. broad, at first brown or blackish-brown, then ochraceous-tawny, viscid when moist; annulus median or distant............................... *P. togularis* (6).
C. Pileus scaly.................................. Subsect. Squamosae.
  1. Spores ferruginous in mass; cystidia rather indefinite but some sterile cells present and recognizable; spores not truncate; pileus 2–8 cm. broad, yellowish with cinnamon or sayal-brown colored fibrous scales................................ *P. terrestris* (7).

II. Fructification growing on or around stumps or trees..................... .... Sect. Truncigenae.
  A. Pileus fleshy, rather compact, not hygrophanous..... Subsect. Carnosae.
    1. Spores ferruginous in mass........................Euderminae.
      a. Pileus usually large, more or less or distinctly viscid when moist; spores smooth.
        i. Spores 3–6 μ long.
          α. Pileus pallid to cinnamon, densely scaly with erect or suberect pointed concolorous scales.................. .... *P. squarrosoides* (8).
        ii. Spores 6–9 μ long; pileus antimony-yellow to zinc-orange, decorated with medium-sized darker colored squamules.... .... *P. adiposa* (9).
        iii. Spores 9–14 μ long; pileus yellowish-brown to testaceous, decorated with erect or suberect brown or blackish, floccose, friable scales..................... *P. albocrenulata* (10).
      b. Pileus usually large, dry.
        i. Spores 3–6 μ long; pileus lemon-yellow to tawny, decorated with fibrous, superficial, sulphur-yellow scales............ .... *P. flammans* (11).
        ii. Spores 6–9 μ long.
          α. Pileus yellow to ochraceous-orange, decorated with conspicuous scales.................. *P. squarrosa* (12).
          β. Pileus with distinct shades of green or ashy-green and with fibrillose scales............. *P. aeruginosa* (13).

iii. Spores 7.5–10 μ long; pileus buff-yellow to apricot-orange.. .... *P. spectabilis* (14).
c. Pileus small, dry, tawny-brown, with minute, granular, tawny scales.................................... *P. erinaceella* (15).
2. Spores dull brown in mass............................ Phaeotae.
a. Pileus viscid or glutinous viscid.
i. Pileus drab or clay colored; stipe fusiform-rooted and long, scaly.................................. *P. radicosa* (16).
ii. Pileus bay-brown, very glutinous; stipe subconcolorous and glutinous when young.................. *P. Nameko* (17).
B. Pileus slightly fleshy, hygrophanous, smooth.... Subsect. Hygrophanae.
1. Pileus 2–5 cm. broad; annulus fugacious........ *P. marginata* (18).
2. Pileus 0.5–2 cm. broad; annulus at first funnel-shaped, persistent and conspicuous................................ *P. unicolor* (19).

Sect. Humigenae Fr.

Epicr. Myc. 160, 1838.

Fructification growing on the ground.

Subsect. Velatae Lange

Agar. Denm. IV, 4, 1921.

Pileus with a powdery bloom or set with fibrous scales.

1. *Pholiota Vahlii* (Schum. ex Fr.) Lange

Agar. Denm. IV, 5, 1921.

Agaricus aureus Matt. Fl. Siles. II, 351, 1779 (teste Fr.).

Agaricus Vahlii Schum. Fl. Dan. pl. 1496, 1813 (teste Fr.).

Agaricus (Pholiota) Vahlii Fr. Syst. Myc. I, 240, 1821; Epicr. Myc. 161, 1838.

Agaricus (Pholiota) aureus Fr. Ibid. 241, 1821; Epicr. Myc. 160, 1838; Hymen. Eur. 214, 1874—Cke. Ill. Brit. Fung. pl. 346, 1888.

Agaricus aureus var. *Vahlii* Fr. Hymen. Eur. 214, 1874.

Agaricus aureus var. *Herefordensis* Cke. Ill. Brit. Fung. pl. 347, 1888.

Pholiota aurea Gill. Hymen. Fr. 435, 1874—Karst. Hattsv. I, 291, 1879—Sacc. Syll. Fung. V, 736, 1887; Fl. Ital. Crypt., Hymen. 677, 1916—Schroet. Pilze Schles. I, 610, 1889—Mass. Brit. Fung. Fl. II, 210, 1893—Ricken, Blätterp. 197, pl. 55, f. 1, 1915—Rea, Brit. Basid. 111, 1922—Overh. Ann. Mo. Bot. Gard. XIV, 121, pl. 12, 1927.

Pholiota aurea var. *Vahlii* Sacc. Syll. Fung. V, 736, 1887.

Pholiota aurea var. *Herefordensis* Sacc. Syll. Fung. V, 736, 1887.

Togaria aurea W. G. Sm. Brit. Basid. 122, 1908.

Gregarious or subcaespitose, edible. Pileus 5–15 cm. or more broad, hemiglobose or conical, then convex, sometimes subumbonate; surface dry, warm-buff to dingy gold-yellow or xanthine-orange, paler at the margin, densely covered with easily separable, subconcolorous or gray or brown colored powders or spiny verrucules, sometimes wrinkled on the center, margin incurved at first, often veiled; context whitish, then yellowish, firm, thick, taste mild, odour agreeable; lamellae almost free or slightly adnexed, rather narrow, white, then cream to ocher, crowded, rarely a few times forked, edge waved or serrulate; stipe 5–15 cm. or more long, 1.5–3 cm. thick, nearly equal or slightly attenuated upward, often enlarged at the base, concolorous or slightly paler, powdery or verruculose, sometimes with longitudinal wrinkles which extend down from annulus, yellow and glabrous above the annulus, solid; annulus membranous, persistent, superior, white above, concolorous and powdery or verruculose and sometimes wrinkled on the under surface; spores nearly clay-color in mass, ellipsoidal or subfusiform, nearly smooth or sparingly warted, 11–12.5 × 4–6 μ; cystidia none.

Hab. On the ground under trees, on roadsides, in pastures, etc. Autumn. Ishikari (Sapporo, Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Kogane-take* (n. n.).

Subsect. Nudae LANGE

Agar. Denm. IV, 4, 1921.

Pileus smooth.

2. *Pholiota blattaria* (FR.) QUÉL.

Champ. Jura Vosg. 1 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 319, 1872—GILL. Hymen. Fr. 433, 1874—KARST. Hattsv. I, 293, 1879—SACC. Syll. Fung. V, 738, 1887—SCHROET. Pilze Schles. I, 608, 1889—MASS. Brit. Fung. Fl. II, 213, 1893—REA, Brit. Basid. 113, 1922—KONR. et MAUBL. Icon. Sel. Fung. pl. 69, f. 2, 1929.

Agaricus (*Pholiota*) *blattarius* FR. Syst. Myc. I, 246, 1821; Epicr. Myc. 162, 1838; Hymen. Eur. 216, 1874—CKE. Ill. Brit. Fung. pl. 1172, f. B, 1891; Handb. Austr. Fung. 43, 1892.

Dryophila (Pholiota) blattaria QUÉL. Ench. Fung. 66, 1886.
Pholiotina blattaria FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 359, 1889.
Togaria blattaria W. G. SM. Brit. Basid. 123, 1908.
Pholiota togularis RICKEN, Blätterp. 199, pl. 56, f. 5, 1915.
Pholiota teneroides LANGE, Agar. Denm. IV, 7, 1921.
Pholiota togularis OVERH. Ann. Mo. Bot. Gard. XIV, 114, 1927.

Solitary or subgregarious. Pileus 1.5–3 cm. broad, conical or subcampanulate, then umbonate or convex; surface glabrous, hygrophanous, ochraceous-ferruginous when wet, becoming paler and slightly rugulose when dried, margin paler, striate; context very thin, concolorous, odour and taste none; lamellae sinuate then free, pale yellowish-ocher or watery-cinnamon, ventricose; stipe 2.5–5 cm. long, about 2 mm. thick, equal or slightly enlarged toward the base, white or slightly yellowish, concolorous at the base, silky then glabrous, fistulose; annulus membranous, white, distant, silky, entire, striate on upper surface; spores ferruginous in mass, ellipsoidal to ovoid, smooth, one end usually truncate, 10–12 × 5–6 μ, cystidia none, but sterile hyaline fusiform cells present on edge of lamellae.

Hab. on the ground among grasses in woods or pastures. Summer. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido), Europe, North America, Australia.

Jap. name. *Kusa-ajirogasa* (n. n.).

3. *Pholiota Arrhenii* (FR.) IMAI, comb. nov.

Agaricus togularis BULL. Champ. Fr. pl. 595, f. 2, 1793—PERS. Syn. Fung. 262, 1801 (*teste* FR.).

Agaricus (Pholiota) Arrhenii FR. Epicr. Myc. 161, 1838.

Agaricus (Pholiota) togularis FR. Hymen. Eur. 216, 1874—CKE. Ill. Brit. Fung. pl. 350, 1886; Handb. Austr. Fung. 43, 1892.

Pholiota togularis GILL. Hymen. Fr. 435, cum icone, 1874—KARST. Hattsv. I, 293, 1879—SACC. Syll. Fung. V, 738, 1887; Fl. Ital. Crypt., Hymen. 678, 1916—SCHROET. Pilze Schles. I, 608, 1889—MASS. Brit. Fung. Fl. II, 212, 1893—LANGE, Agar. Denm. IV, 7, 1921—REA, Brit. Basid. 113, 1922—KONR. et MAUBL. Icon. Sel. Fung. I, pl. 69, f. 1, 1929.

Dryophila (Pholiota) togularis QUÉL. Ench. Fung. 66, 1886.

Hylophila togularis QUÉL. Fl. Myc. 96, 1888; Champ. Jura .Vosg. 19 Suppl., in Assoc. Fr. XXII, 485, 1893.

Pholiotina togularis FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 356, pl. 6, f. 6, h, 1889.

Togaria togularis W. G. SM. Brit. Basid. 123, 1908.

Subgregarious. Pileus 2–4 cm. broad, campanulate, then convex or subumbonate, obtuse; surface glabrous, slightly hygrophanous, cinnamon-buff or pallid ochraceous, darker at the disc, not striate; context yellowish, odour and taste none; lamellae adnato-sinuate then free, yellow at first, then pallid ferruginous, moderately crowded, attenuated at both ends; stipe 3–7 cm. long, 3–7 mm. thick, nearly equal or slightly enlarged at the base, yellowish, paler at the apex, brownish at the base, fibrously striate, hollow; annulus membranous, distant or median, subconcolorous with the stipe, striate; spores ferruginous in mass, ellipsoidal, smooth, sometimes with a very slightly truncated end, 9 × 5 μ; cystidia none, but sterile hyaline and cylindric cells present.

Hab. on the ground in woods or pastures. Spring to autumn. Ishikari (Nopporo), Kitami (Oketo forest).

Distr. Japan (Hokkaido), Europe, North America, Australia.

Jap. name. *Tsuchi-ichimegasa-take* (n. n.).

4. *Pholiota praecox* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 124, 1872—GILL. Hymen. Fr. 434, cum icone, 1874—KARST. Hattsv. I, 294, 1879—SACC. Syll. Fung. V, 738, 1887; Fl. Ital. Crypt., Hymen. 678, 1916—MASS. Brit. Fung. Fl. II, 214, 1893—ATKINS. Mushrooms, ed. 2, 150, f. 145, 1903—ROLLAND, Atlas Champ. 60, f. 134, 1910—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 478, pl. 27, 28, f. A–B, 1913; Ibid. XVIII, 397, pl. 14, f. C–D, 1916—RICKEN, Blätterp. 191, pl. 55, f. 4, 1915—KAUFFM. Agar. Mich. 293, pl. 59, 1918—LANGE, Agar. Denm. IV, 6, 1921—REA, Brit. Basid. 114, 1922—OVERH. Ann. Mo. Bot. Gard. XIV, 106, pl. 9, 1927—BRES. Icon. Myc. XIV, pl. 690, 691, 1930.

[MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 116, 1931]

Agaricus candicans SCHAEFF. Fung. Bavar. IV, Ind. 50, pl. 217, 1774 (teste FR.).

Agaricus praecox PERS. Comm. Fung. Bavar. 89, 1800; Syn. Fung. 420, 1801 (teste FR.).

Agaricus (Psalliota) praecox FR. Syst. Myc. I, 282, 1821—BERK. in SMITH, Engl. Fl. V, (2), 107, 1836.

Agaricus (Pholiota) praecox FR. Epicr. Myc. 162, 1838; Hymen. Eur. 217, 1874—RABENH. Deut. Krypt. Fl. I, 487, 1844—BERK. Outl. Brit. Fung. 149, pl. 8, f. 1, 1860—KICKX, Fl. Crypt. Flandr. II, 164, 1870—CKE. Handb. Brit. Fung. I, 105, 1871; Ill. Brit. Fung. pl. 360, 1886; Handb. Austr. Fung. 43, 1892—WINT. Die Pilze, I, 703, 1884.

Dryophila (Pholiota) praecox QUÉL. Ench. Fung. 67, 1886.

Agrocybe praecox FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 358, 1889.

Pholiota candicans SCHROET. Pilze Schles. I, 608, 1889—OVERH. North Am. Fl. X, 264, 1924.

Togaria praecox W. G. SM. Brit. Basid. 124, 1908.

Gregarious or solitary, edible. Pileus 4–8 cm. broad, subglobose to convex, then plane; surface smooth, glabrous, sometimes provided with a few fissures on the center in maturity, cream-color or straw color, ochraceous-buff at the center, viscid when wet, pellicle not separable, margin incurved, with remnant of the whitish cottony veils; veil distinct when young; context white, fleshy, thick, taste and odour none; lamellae adnate, moderately crowded, dull white or yellowish at first, then umber-colored, 3–5 mm. wide; stipe 5–10 cm. long, 7–10 mm. thick, equal, white or creamy, fibrous external, hollow; annulus persistent or fugacious, nearly fibrous, superior; spores dull brown in mass, ellipsoidal, 10–13 × 6–9 μ, slightly truncate at the one end, with 1–3 small guttae; cystidia present, flask-shaped or ventricose, sometimes rare, projecting.

Hab. on the ground, especially in grassy places. Summer. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), China, Siberia, Asia Minor, Europe, North America.

Jap. name. *Fumizuki-take* (IMAI).

5. *Pholiota erebia* (FR.) GILL.

Hymen. Fr. 432, 1874—KARST. Hattsv. I, 292, 1879—SACC. Syll. Fung. V, 737, 1887; Fl. Ital. Crypt., Hymen. 677, 1916—SCHROET. Pilze Schles. I, 608, 1889—MASS. Brit. Fung. Fl. II, 211, 1893—RICKEN, Blätterp. 198, pl. 56, f. 1, 1915—REA, Brit. Basid. 112, 1922—OVERH. Ann. Mo. Bot. Gard. XIV, 118, 1927—BRES. Icon. Myc. XIV, pl. 685, 1930.

Agaricus (Pholiota) erebius FR. Syst. Myc. I, 246, 1821; Epicr. Myc. 162, 1838; Hymen. Eur. 216, 1874—CKE. Ill. Brit. Fung. pl. 358, 1886; Handb. Austr. Fung. 43, 1892.

Togaria erebia W. G. SM. Brit. Basid. 122, 1908.

Gregarious or subcaespitose, edible. Pileus 1–5 cm. broad, convex, then becoming plane or slightly depressed, rarely slightly umbonate; surface at first brown or blackish brown, drying out to umber, then ochraceous-tawny or buckthorn-brown, hygrophanous and subviscid when moist, with a few white fibers on the margin, even or rugulose, or reticulate; margin slightly striatulate at times; context pallid, odour and taste none; lamellae adnate or slightly decurrent,

crowded or slightly distant, 2–4 mm. broad, pallid or grayish, becoming rusty-brown, edge at first white-fimbriate; stipe 2.5–7 cm. long, 3–8 mm. thick, equal or slightly enlarged at the base, brownish below, white and pruinose above the annulus, fibrillose or glabrous below, or at times slightly squamulose at the base, solid; annulus superior, apical, membranous, often reflexed, striate, white; spores dull brown in mass, elongate-ellipsoidal or ellipsoidal-fusoid, smooth, 10–15 × 5–7.5 μ; cystidia present, usually abundant, hyaline, 7–12 μ broad at the enlarged base, projecting.

Hab. on the ground by road sides and in woods. Autumn. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Australia.

Jap. name. *Tsuchi-nameko* (n. n.).

6. *Pholiota togularis* (FR.) IMAI, comb. nov. (non GILL. nec Auct. plur.)

Agaricus (*Pholiota*) *togularis* (non BULL. nec PERS.) FR. Syst. Myc. 1, 241, 1821; Epicr. Myc. 161, 1838.

Agaricus (*Pholiota*) *ombrophilus* FR. Hymen. Eur. 216, 1874.

Pholiota ombrophila KARST. Hattsv. I, 292, 1879—QUÉL. Ench. Fung. 66, 1886—SACC. Syll. Fung. V, 737, 1887; Fl. Ital. Crypt., Hymen. 674, 1916—MASS. Brit. Fung. Fl. II, 212, 1893—RICKEN, Blätterp. 460, 1915—REA, Brit. Basid. 112, 1922—OVERH. North. Am. Fl. X, 263, 1924; Ann. Mo. Bot. Gard. XIV, 120, 1927.

Pholiota ombrophila var. *brunneola* KARST. Ibid. 293, 1879—MASS. l. c. II, 212, 1893—REA, l. c. 113, 1922.

Agaricus ombrophilus var. *brunneolus* FR. Icon. Hymen. II, 2, pl. 103, f. 2, 1887.

Pholiota washingtonensis MURRILL, Mycologia, IV, 259, 1912.

Gregarious or solitary, edible. Pileus 4–8 cm. broad, convex, then becoming plane or slightly depressed, rarely slightly umbonate; surface at first brown or dark-brown, discolored to paler by drying, hygrophanous and somewhat viscid when wet, at first with a few white floccose fibers or scales on the margin, even or substriate on the margin; context whitish or pallid, odour and taste none; lamellae adnate or slightly decurrent, subcrowded or subdistant, pallid or grayish, then rusty-brown, edge at first white-fimbriate; stipe 5–8 cm. long, 5–10 mm. thick, equal or slightly enlarged at the base, whitish or brownish, darker below, obsolately fibrillose or striate,

stuffed; annulus membranous, median or distant, striate above, white; spores dull brown in mass, elongate-ellipsoidal or ellipsoidal-fusoid, smooth, 10–15 × 5–7.5 μ; cystidia present, usually abundant, hyaline, flask-shaped, projecting.

Hab. on the ground in woods, under trees or roadsides, etc. Autumn. Ishikari (Sapporo, Nopporo), Iburi (Lake side of Shikotsu), Oshima (Ônomura).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *O-tsuchi-nameko* (n. n.).

Subsect. **Squamosae** IMAI, subsect. nov.

Pileus squamosus.

7. ***Pholiota terrestris*** OVERH.

North Amer. Fl. X, 268, 1924; Ann. Mo. Bot. Gard. XIV, 126, 1927.
?*Agaricus* (*Pholiota*) *terrigena* FR. et Auct. plur.
?*Pholiota terrigena* Auct. plur.

Caespitose or gregarious, edible. Pileus 2–8 cm. broad, convex or subconical, then expanded, obtuse; surface dry, yellowish (cream color or straw-yellow) with cinnamon or sayal-brown colored, triangular fibrous scales, scales erected on the center, adpressed on the margin; context yellowish, taste and odour mild; veil floccose-membranous, not forming a distinct annulus, but sometimes adhering considerably to the margin of pileus; lamellae adnate or adnexed and with a decurrent tooth or subsinuate, yellowish at first, then olivaceous-ferruginous, moderately crowded; stipe 2.5–8 cm. long, 3–13 mm. thick, equal, concolorous, with small pointed fibrous scales colored with cinnamon or sayal-brown, whitish or yellowish and subfurfuraceous above the annulus, stuffed then hollow; annulus thin, fibrous, torn, cinnamon; spores ferruginous in mass, oblong ellipsoidal, smooth, 5.5–6.5 × 3.5–4.5 μ; cystidia of several inconspicuous types, none projecting strongly, some brown or with a brown mass within.

Hab. on the ground among grasses or along roadsides in woods, in pastures, etc. Summer to autumn. Ishikari (Sapporo, Nopporo), Iburi (Chitose).

Distr. Japan (Hokkaido, Honshu), North America, ?Europe.

Jap. name. *Tsuchi-sugitake* (n. n.).

Sect. Truncigenae FR.

Epicr. Myc. 163, 1838.

Fructification growing on or around stumps or trees.

Subsect. Carnosae LANGE

Agar. Denm. IV, 4, 1921.

Pileus fleshy, rather compact, not hygrophanous.

8. *Pholiota squarrosoides* (PK.) SACC.

Syll. Fung. V, 750, 1887—ATKINS. Mushrooms, ed. 2, 152, f. 148, 1903—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 486, pl. 36–37, 1913—KAUFFM. Agar. Mich. 299, 1918—OVERH. Ann. Mo. Bot. Gard. XIV, 155, pl. 22, 1927.

Agaricus squarrosoides PK. 31 Ann. Rep. N. Y. State Mus. 33, 1879.
Hypodendrum squarrosoides OVERH. North Amer. Fl. X, 278, 1932.

Caespitose, edible. Pileus 3–13 cm. broad, subglobose to convex or nearly plane; surface light-colored, usually pinkish-buff to cinnamon-buff, covered with erect, pointed, cinnamon to hazel-colored scales that give color to the pileus, sometimes disappearing on the margin, viscid; context whitish or slightly yellowish, taste and odour pleasant; lamellae sinuate-adnate, crowded, 4–7 mm. broad, whitish, becoming cinnamon; stipe 5–15 cm. long, 5–14 mm. thick, equal, brownish, with cinnamon-buff or cinnamon colored floccose scales below the annulus, whitish and glabrous above, solid or stuffed; annulus floccose-membranous, fugacious, cinnamon-buff; spores tawny or russet in mass, ellipsoidal or oblong-ellipsoidal, smooth, $4–6 \times 3–4\ \mu$, cystidia present, (a) hyaline, pointed at the apex, projecting slightly; (b) with yellowish contents, obtuse or pointed.

Hab. on stumps and trunks of deciduous trees. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), China, North America.

Jap. name. *Sugi-take-modoki* (n. n.).

9. *Pholiota adiposa* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 126, 1872—GILL. Hymen. Fr. 442, 1874—KARST. Hattsv. I, 300, 1879—SACC. Syll. Fung.

V, 752, 1887; Fl. Ital. Crypt., Hymen. 685, 1916—SCHROET. Pilze Schles. I, 612, 1889—MASS. Brit. Fung. Fl. II, 223, 1893—ATKINS. Mushrooms, ed. 2, 151, f. 146, 1903—W. G. SM. Brit. Basid. 128, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 487, pl. 40, 1913—KAWAMURA, Ill. Jap. Fung. pl. 8, f. 15–16, 1913 —RICKEN, Blätterp. 194, 1915—KAUFFM. Agar. Mich. 305, 1918—LANGE, Agar. Denm. IV, 9, 1921—REA, Brit. Basid. 119, 1922—OVERH. Ann. Mo. Bot. Gard. XIV, 154, pl. 20–21, 1927—BRES. Icon. Myc. XIV, pl. 699, 1930.

[SHIRAI, List Jap. Fung. ed. 2, 427, 1917; ed. 3, 258, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 115, 1931—IMAI, Bot. Mag. (Tokyo), XLVII, 385, 1933]

Agaricus (Pholiota) adiposus FR. Syst. Myc. I, 243, 1821; Epicr. Myc. 166, 1838; Hymen. Eur. 222, 1874—BERK. in SMITH, Engl. Fl. V, (2), 91, 1836; Outl. Brit. Fung. 151, pl. 8, f. 2, 1860—RABENH. Deut. Krypt. Fl. I, 486, 1844—CKE. Handb. Brit. Fung. I, 108, 1871; Ill. Brit. Fung. pl. 353, 1886—WINT. Die Pilze, I, 698, 1884.

Hypodendrum adiposum OVERH. North Amer. Fl. X, 279, 1932.

Caespitose or gregarious, sometimes solitary, edible. Pileus 3.5–15 cm. broad, convex, then plane or somewhat gibbous; surface very viscid when wet, slightly shining when dry, margin yellowish and veiled, center nearly ferruginous, scaly, scales ferruginous to russet colored, tufted fibrous, triangular, separable, larger at the margin; veil membranous, thin, dingy yellow; context whitish or yellowish, fleshy, thick, compact, then spongy, taste and odour mild; lamellae adnate or adnexed, broad, yellowish then nearly ferruginous, close; stipe 4–12 cm. long, 5–20 mm. thick, equal or slightly attenuated upward, subbulbous at the base, citron-yellow, covered with squamuloso-reflexed ferruginous scales, especially near the annulus, dull yellowish above the annulus, solid; annulus floccose, submembranous, dull-yellow, persistent, sometimes fugacious; spores ferruginous in mass, oblong, 7–9 × 3–5 μ; cystidia present, not conspicuous, not projecting, dark brown, clavate, 20–35 × 5–9 μ.

Hab. on the trunks of deciduous trees. Spring to autumn. Ishikari (Sapporo), Tokachi (Lake side of Shikaribetsu).

Ditsr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Numeri-sugi-take* (KAWAMURA).

10. *Pholiota albocrenulata* (PK.) SACC.

Syll. Fung. V, 760, 1887—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 490, pl. 42–43, 1913—KAUFFM. Agar. Mich. 301, 1918—OVERH. Ann. Mo. Bot. Gard. XIV, 150, pl. 19, 1927.

Agaricus albocrenulatus PK. Bull. Buffalo Soc. Nat. Sci. I, 49, 1873.

Pholiota fusca QUÉL. Champ. Jura Vosg. 4 Suppl., in Bull. Soc. Bot. Fr. XXIII, 327, pl. 3, f. 12, 1876.

Hypodendrum albocrenulatum OVERH. North Amer. Fl. X, 281, 1932.

Solitary or two or three in a cluster. Pileus 2.5–12 cm. broad, conico-campanulate to convex or umbonate, finally nearly plane; surface yellowish-brown to testaceous or Sanford's-brown (or Kaiser-brown), paler (vinaceous-tawny) on the margin, darker (burnt umber) at the umbo or center, viscid, with erect or suberect, brown or blackish, floccose scales that are easily separable and sometimes disappear in old plants, margin even, at length reflexed, often partly appendiculate with cinnamon-buff colored floccoso-membranous veil; context whitish, thick; lamellae adnate with a decurrent tooth or sinuate-adnate, crowded, light drab or whitish, then ferruginous or cinnamon-brown, distinctly white-crenulate on the edge remaining so at least in part in the dried plants; stipe 5–15 cm. long, 5–15 mm. thick, equal or somewhat enlarged at the base, brownish, abundantly fibrilloso-squamulose, colored cinnamon or sayal-brown up to the annulus, white or brownish and furfuraceous above the annulus; annulus apical, fugacious; spores ferruginous in mass, fusoid-ellipsoidal or broadly ellipsoidal, smooth, $10–13 \times 6–7.5\ \mu$; cystidia none.

Hab. growing on trunks of deciduous trees, especially of *Ulmus japonica* SARG. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), North America, Europe.

Jap. name. *Shibu-iro-sugitake* (n. n.).

11. *Pholiota flammans* (BATSCH ex FR.) QUÉL.

Champ. Jura Vosg. 4 Suppl. 3, 1876—KARST. Hattsv. I, 301, 1879—SACC. Syll. Fung. V, 753, 1887—MASS. Brit. Fung. Fl. II, 224, 1893—W. G. SM. Brit. Basid. 129, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 488, pl. 41, f. C, 1913—KAWAMURA, Ill. Jap. Fung. pl. 10, f. 11–12, 1914—RICKEN, Blätterp. 196, pl. 55, f. 5, 1915—KAUFFM. Agar. Mich. 306, 1918—LANGE, Agar. Denm. IV, 10, 1921—REA, Brit. Basid. 120, 1922—OVERH. Ann. Mo. Bot. Gard. XIV, 148, pl. 19, 1927.

[SHIRAI, List Jap. Fung. ed. 2, 429, 1917; ed. 3, 258, 1927]

Agaricus flammans BATSCH, Elench. Fung. 87, pl. 7, f. 3, 1783 (teste FR.).

Agaricus (Pholiota) flammans FR. Syst. Myc. I, 244, 1821 (excl. syn.); Epicr. Myc. 167, 1838; Hymen. Eur. 222, 1874—BERK. in SMITH, Engl. Fl. V, (2), 92, 1836; Outl. Brit. Fung. 151, 1860—RABENH. Deut. Krypt. Fl. I, 485, 1844—CKE. Handb. Brit. Fung. I, 108, 1871; Ill. Brit. Fung. pl. 368, 1886—WINT. Die Pilze, I, 698, 1884.

Dryophila (Pholiota) flammans QUÉL. Ench. Fung. 68, 1886.

Hypodendrum flammans MURRILL, Mycologia, IV, 261, 1912—OVERH. North Amer. Fl. X, 278, 1932.

Caespitose, gregarious or solitary. Pileus 2–10 cm. broad, convex then plane, sometimes umbonate; surface lemon-yellow or tawny-yellow, zinc-orange or tawny in dried plants, dry, adorned with somewhat concentric arranged yellow, superficial floccose-fibrillose scales that may in large part disappear with age; context thin, yellow; lamellae adnate or very slightly uncinate, crowded, yellow then ferruginous; stipe 4–8 cm. long, 4–12 mm. thick, equal, sometimes flexuose, pale yellow or yellowish, with yellow, recurved, floccose scales or scarcely more than densely yellow floccose up to the annulus, stuffed or hollow; annulus lemon-yellow, floccose, apical, fugacious; spores ferruginous in mass, oblong, smooth, 3–6 × 2–3 μ; cystidia abundant, flask-shaped or clavate-fusoid, brown or hyaline, projecting slightly.

Hab. on dead wood of coniferous and deciduous trees. Autumn. Ishikari (Mt. Kurodake), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Hanagasa-take* (KAWAMURA).

12. *Pholiota squarrosa* (MÜLL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 126, 1872—GILL. Hymen. Fr. 441, 1874—KARST. Hattsv. I, 298, 1879—SACC. Syll. Fung. V, 749, 1887; Fl. Ital. Crypt., Hymen. 689, 1916—SCHROET. Pilze Schles. I, 611, 1889—MASS. Brit. Fung. Fl. II, 221, 1893—W. G. SM. Brit. Basid. 128, 1908—ROLLAND, Atlas Champ. 61, f. 137, 1910—RICKEN, Blätterp. 195, pl. 54, f. 3, 1915—LANGE, Agar. Denm. IV, 9, 1921—REA, Brit. Basid. 117, 1922—OVERH. Ann. Mo. Bot. Gard. XIV, 157, pl. 21, 1927—BRES. Icon. Myc. XIV, pl. 697, 1930.

[SHIRAI, List Jap. Fung. ed. 2, 429, 1917; ed. 3, 258, 1927]

Agaricus floccosus SCHAEFF. Fung. Bavar. IV, Ind. 27, pl. 61, 1774—SOW. Engl. Fung. III, pl. 284, 1803 (teste FR.).

Agaricus squarrosus MÜLL. Fl. Dan. pl. 491, 1783—PERS. Syn. Fung. 268, 1801 (teste FR.).

Agaricus squamosus BULL. Champ. Fr. pl. 266, 1791 (teste FR.).

Agaricus (Pholiota) squarrosus FR. Syst. Myc. I, 243, 1821; Epicr. Myc. 165, 1838; Hymen. Eur. 221, 1874—BERK. in SMITH, Engl. Fl. V, (2), 91, 1836; Outl. Brit. Fung. 150, 1860—RABENH. Deut. Krypt. Fl. I, 486, 1844—KICKX, Fl. Crypt. Flandr. II, 165, 1867—CKE. Handb. Brit. Fung. I, 107, 1871; Ill. Brit. Fung. pl. 367, 1886—WINT. Die Pilze, I, 699, 1884.

Dryophila (Pholiota) squarrosa QUÉL. Ench. Fung. 68, 1886.

Hypodendrum floccosum OVERH. North Amer. Fl. X, 280, 1932.

Usually caespitose, edible. Pileus 3–10 cm. broad, campanulate to convex, or plane; surface yellowish (straw-yellow) or yellowish-brown (clay or tawny) or antimony-yellow, covered with recurved, crowded, darker persistent scales, dry; context yellowish, taste and odour mild; lamellae sinuate-adnate or adnate with a decurrent tooth, crowded, 3–6 mm. broad, pallid olivaceous then ferruginous; stipe 5–20 cm. long, 5–16 mm. thick, equal, pallid, yellow or brown, with crowded, recurved darker scales up to the annulus, smooth and yellowish above the annulus, solid; annulus superior, fibrillose, laciniate, persistent, concolorous with the scales; spores ferruginous in mass, oblong or ellipsoidal, smooth, 6–8 × 3.5–5 μ; cystidia present, variable, of two general types: (a) hyaline, abundant, ventricose-clavate, blunt or pointed at the apex, projecting, and (b) yellow, blunt or truncate at the apex, mostly projecting.

Hab. on dead trunks or stumps of various trees, both deciduous and evergreen. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Siberia, Europe, North America.

Jap. name. *Sugi-take* (KAWAMURA).

13. *Pholiota aeruginosa* PK.

43 Ann. Rep. N. Y. State Mus. 81(35), 1890—KAUFFM. Agar. Mich. 308, pl. 62, 1918—OVERH. North Amer. Fl. X, 269, 1924; Ann. Mo. Bot. Gard. XIV, 147, pl. 18, 1927.

Flammula viridans MURRILL, Mycologia, IV, 262, 1912.

Gregarious or caespitose. Pileus 2–10 cm. broad, convex; surface greenish, becoming tinged with yellow or brown, drab to cinnamon or ochraceous-buff, often variegated with dark-olive or dusky-drab color in dried specimens, dry, at first glabrous, then becoming rather distinctly fibrillose-scaly or squamulose, finally usually becoming more or less areolate or squarrose without areolae, margin thin, at length slightly upturned; context with a greenish tint, yellowish in dried specimens, odour pleasant, taste bitterish; lamellae adnate, sinuate-adnate or adnexed, easily separating, 3–7 mm. broad, broader behind, pale-ochraceous when young, becoming ochraceous-orange or apricot-buff on drying; stipe 3–8 cm. long, 3–10 mm. thick, central or excentric, equal or nearly so, glabrous or slightly fibrillose, some-

times sulcate-striate, concolorous, solid; spores mars-yellow in mass, ellipsoidal, echinulate when matured, 6–9.5 × 3.5–6 μ; cystidia none.

Hab. on coniferous wood. Late summer to autumn. Ishikari (Iwamizawa).

Distr. Japan (Hokkaido), North America.

Jap. name. *Midori-sugitake* (n. n.).

14. *Pholiota spectabilis* (FR.) GILL.

Hymen. Fr. 443, 1874—KARST. Hattsv. I, 299, 1879—SACC. Syll. Fung. V, 751, 1887; Fl. Ital. Crypt., Hymen. 686, 1916—MASS. Brit. Fung. Fl. II, 222, 1893—W. G. SM. Brit. Basid. 128, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 490, pl. 44, 1913—KAUFFM. Agar. Mich. 304, pl. 61, 1918—LANGE, Agar. Denm. IV, 10, 1921—REA, Brit. Basid. 119, 1922—OVERH. North Amer. Fl. X, 270, 1924; Ann. Mo. Bot. Gard. XIV, 144, pl. 16–17, 1927—BRES. Icon. Myc. XIV, pl. 698, 1930.

[KAWAMURA, Edible & Poisonous Mushrooms, 171, f. 151–152, 1931]

Agaricus aureus SOW. Engl. Fung. I, pl. 77, 1797 (teste FR.)—PERS. Syn. Fung. 269, 1801—BERK. in SMITH, Engl. Fl. V, (2), 90, 1836; Outl. Brit. Fung. 149, 1860—BERK. & BR. Ann. Mag. Nat. Hist. 3 ser. VII, 374, 1861.

Agaricus (*Pholiota*) *spectabilis* FR. Elench. Fung. I, 28, 1828; Epicr. Myc. 166, 1838; Hymen. Eur. 221, 1874—RABENH. Deut. Krypt. Fl. I, 486, 1844—CKE. Handb. Brit. Fung. I, 108, 1871; Ill. Brit. Fung. pl. 352, 1886; Handb. Austr. Fung. 45, 1892—WINT. Die Pilze, I, 699, 1884.

Pholiota lutea PK. 51 Ann. Rep. N. Y. State Mus. 288, 1898.

Pholiota ventricosa EARLE, Bull. N. Y. Bot. Gard. II, 341, 1902.

Pholiota aurea RICKEN, Blätterp. 197, pl. 55, f. 1, 1915.

Usually subcaespitose or caespitose, said to be poisonous in Japan. Pileus 4–15 cm. broad, convex, becoming nearly plane; surface buff-yellow to apricot-orange or zinc-orange, becoming at times slightly more brownish (tawny) in dried specimens, dry or moist, finely silky or subglabrous at first, then distinctly fibrillose or rivulose, finally subsquamulose; context yellow, thick, compact, taste bitter or amygdaline; lamellae adnexed to adnate or with a decurrent tooth or line, subcrowded, 3–8 mm. broad, yellow becoming ferruginous; stipe 3–15 cm. long, 5–30 mm. thick, equal to decidedly ventricose or bulbously enlarged at the base, yellow or tawny, yellow and floccose above the annulus, fibrillose or furfuraceous below, solid; annulus apical or superior, subpersistent, yellowish then discolered, reflexed, striate; spores ferruginous in mass, ellipsoidal, asperulate, 7–10 × 4.5–6 μ; cystidia none.

Hab. on stumps and trunks of deciduous or, rarely, coniferous trees, or growing on buried wood. Summer to autumn. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Australia.

Jap. name. *Ô-waraitake* (KAWAMURA).

15. *Pholiota erinaceella* PK.

122 Bull. N. Y. State Mus. 152, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 495, pl. 51, 1913—KAUFFM. Agar. Mich. 303, 1918—OVERH. North Amer. Fl. X, 269, 1924; Ann. Mo. Bot. Gard. XIV, 161, 1927.

Agaricus detersibilis (non BERK. et CURT.) PK. 28 Ann. Rep. N. Y. State Mus. 49, 1876.

Agaricus erinaceellus PK. 30 Ann. Rep. N. Y. State Mus. 70, 1878.

Solitary. Pileus 0.5–4 cm. broad, hemispherical, then convex to nearly plane; surface tawny, not changing color in drying, dry, densely covered with minute, erect, pyramidal, spine-like or granular, tawny scales; lamellae adnexed or adnate, crowded or subdistant, pallid then ochraceous-tawny or cinnamon-brown, yellowish and minutely serrulate on the edge; stipe 1.5–4.5 cm. long, 1–5 mm. thick, equal or slightly attenuated downward, tawny, with numerous, floccose scales or granules below the annulus, smooth and yellowish above, stuffed or hollow; annulus superior, floccose, evanescent, concolorous with the stipe; spores ferruginous in mass, ellipsoidal or naviculoid, smooth, 6–8 × 4–5 μ; cystidia none, sterile hyaline clavate cells present on the edge of lamellae.

Hab. on dead wood of deciduous trees. Summer. Ishikari (Sapporo).

Distr. Japan (Hokkaido), North America.

Jap. name. *Hime-sugitake* (n. n.).

16. *Pholiota radicosa* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 125, 1872 —GILL. Hymen. Fr. 438, cum icone, 1874—KARST. Hattsv. I, 295, 1879—SACC. Syll. Fung. V, 741, 1887; Fl. Ital. Crypt., Hymen. 684, 1916—SCHROET. Pilze Schles. I, 610, 1889—MASS. Brit. Fung. Fl. II, 215, 1893—W. G. SM. Brit. Basid. 126, 1908—ROLLAND, Atlas Champ. 61, f. 136, 1910—LANGE, Agar. Denm. IV, 8, 1921—REA, Brit. Basid. 115, 1922—BRES. Icon. Myc. XIV, pl. 693, 1930.

Agaricus radicosus BULL. Champ. Fr. pl. 160, 1791—PERS. Syn. Fung. 266, 1801 (teste FR.).

Agaricus (Pholiota) radicosus FR. Syst. Myc. I, 242, 1821; Epicr. Myc. 163, 1838; Hymen. Eur. 218, 1874—BERK. in SMITH, Engl. Fl. V, (2), 90, 1836; Outl. Brit. Fung. 150, 1860—RABENH. Deut. Krypt. Fl. I, 487, 1844—KICKX, Fl. Crypt. Flandr. II, 165, 1867—CKE. Handb. Brit. Fung. I, 105, 1871; Ill. Brit. Fung. pl. 361, 1886—WINT. Die Pilze, I, 702, 1884.

Dryophila (Pholiota) radicosa QUÉL. Ench. Fung. 67, 1886.

Hebeloma radicosum RICKEN, Blätterp. 115, pl. 33, f. 1, 1915.

Solitary or gregarious, edible. Pileus 5–10 cm. or more broad, convex, obtuse, then nearly plane; surface smooth, glabrous, viscid when wet, shining when dry, nearly drab or clay color, then spotted rufous; context whitish, moderately thick, odour pleasant, taste submild; lamellae rounded behind, somewhat free, pallid, then rufescent ferruginous, very crowded, ventricose, edge white-pruinose and subserrulate; stipe 8–15 cm. long, 1–2 cm. thick, thickened at the base, and fusiform-rooted, subconcolorous or whitish, white pruinose above the annulus, concentrically scaly below the annulus, the scales often floccose and erect and becoming rufous, solid or stuffed, at length subhollow; annulus membranous, medial or subinferior, distant, rather erect, entire, scaly, whitish; spores dull brown in mass, fusoid-amygdaloid, apiculate, punctate-scabrate, 8–10 × 5–6 μ; cystidia none, sterile hyaline cells on edge of lamellae cylindrical-clavate, subcapitate.

Hab. about stumps in woods, especially about frondose ones. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Naga-e-no-sugitake* (n. n.).

17. *Pholiota Nameko* (T. ITO) S. ITO et IMAI

Bot. Mag. (Tokyo), XLVII, 388, 1933.

Collybia Nameko T. ITO, Proceed. Imp. Acad. Tokyo, V, 145, cum icone, 1929.

Densely caespitose or gregarious, edible. Pileus 2.5–10 cm. broad, hemispherical then convex to plane; surface bay-brown at the center, paler on the margin, then becoming paler with age, smooth, glabrous, glutinous, margin thin, incurved at first, not striate, at times appendiculate with glutinous veil; context yellowish, very thin at the margin, taste and odour pleasant; lamellae adnate with a decurrent

tooth, emarginate or adnexed, yellowish then cchraceous-buff, very crowded, often waved on edge; stipe 2.5–7 cm. long, 3–15 mm. thick, equal, slightly enlarged at the base, cinnamon-buff or concolorous with the margin of pileus, or slightly paler, glutinous below the annulus, whitish and silky fibrous above, solid or slightly hollow; annulus thin, glutinous, superior, cinnamon-buff, fugacious; spores dull brown (tawny-olive or dresden-brown) in mass, ellipsoidal, oblong or subovate, obtuse, not truncate at the ends, 5–6 × 2.5–3 μ; cystidia none, sterile cells on the edge of lamellae clavate-cylindrical or cylindrical, slightly longer than the paraphyses, hyaline, 5–7.5 μ thick, usually vacuolate.

Hab. on the trunks of deciduous trees, of *Fagus, Broussonetia, Betula, Quercus*, etc. Autumn. Ishikari (Jôzankei, Nakayama-tôge).

Distr. Endemic (Hokkaido, Honshu).

Jap. name. *Nameko* (T. ITO).

Subsect. **Hygrophanae** FR. emend. LANGE

Agar. Denm. IV, 5, 1921.

Agaricus § *Pholiota* § *Truncigeni* § *Hygrophani* FR. Hymen. Eur. 224, 1874.

Pileus slightly fleshy, hygrophanous, smooth.

18. ***Pholiota marginata*** (BATSCH ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 127, 1872—GILL. Hymen. Fr. 436, 1874—KARST. Hattsv. I, 305, 1879—SACC. Syll. Fung. V, 758, 1887; Fl. Ital. Crypt., Hymen. 679, 1916—SCHROET. Pilze Schles. I, 609, 1889—MASS. Brit. Fung. Fl. II, 229, 1893—ATKINS. Mushrooms, ed. 2, 151, f. 147, 1903—W. G. SM. Brit. Basid. 130, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 496, pl. 55–56, 1913—RICKEN, Blätterp. 200, pl. 56, f. 7, 1915—KAUFFM. Agar. Mich. 311, 1918—LANGE, Agar. Denm. IV, 10, 1921—REA, Brit. Basid. 123, 1922—OVERH. North Amer. Fl. X, 273, 1924; Ann. Mo. Bot. Gard. XIV, 132, pl. 14, 1927—BRES. Icon. Myc. XV, pl. 704, 1930.

Agaricus marginatus BATSCH, Elench. Fung. Cont. II, 65, pl. 37, f. 207, 1789 (teste FR.).

Agaricus (Pholiota) mutabilis b. *denudatus* FR. Syst. Myc. I, 245, 1821.

Agaricus (Pholiota) marginatus FR. Epicr. Myc. 169, 1838; Hymen. Eur. 225, 1874—BERK. Outl. Brit. Fung. 151, 1860—CKE. Handb. Brit. Fung. I, 109, 1871; Ill. Brit. Fung. pl. 372, 1886; Handb. Austr. Fung. 45, 1892—WINT. Die Pilze, I, 696, 1884.

Dryophila (Pholiota) marginata QUÉL. Ench. Fung. 69, 1886.

Gregarious or solitary. Pileus 1–7 cm. broad, convex then plane or slightly depressed, sometimes somewhat umbilicate, more rarely slightly umbonate; surface argus-brown, cinnamon-brown or sudan-brown when moist, warm-buff to ochraceous-orange when dry, hygrophanous, glabrous, margin usually striatulate when moist, often extending somewhat beyond the lamellae; context thin, concolorous with the pileus, taste and odour farinaceous; lamellae sinuate-adnate to adnate or slightly decurrent, crowded to slightly distant, 2–7 mm. broad, subconcolorous with the pileus; stipe 2–8 cm. long, 2–8 mm. thick, nearly equal, fibrillose, pruinose at the top and with a white tomentum at the base, concolorous with or paler than the pileus, hollow; annulus membranous, superior, fugacious or subpersistent, pale yellow then cinnamon; spores ferruginous in mass, ellipsoidal or fusiform-ellipsoidal, often smooth when young, with a rough wall when matured, 7–10 × 4.5–6 μ; cystidia present, but usually not abundant, fusoido-ventricose or flask-shaped with a long apex, projecting, hyaline.

Hab. on rotten wood, either exposed or buried, of either deciduous or coniferous trees. Summer to autumn. Ishikari (Nopporo), Iburi (Chitose).

Distr. Japan (Hokkaido), Siberia, Asia Minor, Europe, North America, Australia.

Jap. name. *Hime-ajirogasa-take* (n. n.).

19. *Pholiota unicolor* (VAHL ex FR.) GILL.

Hymen. Fr. 436, cum icone, 1874—KARST. Hattsv. I, 305, 1879—SACC. Syll. Fung. V, 759, 1887; Fl. Ital. Crypt., Hymen. 679, 1916—SCHROET. Pilze Schles. I, 609, 1889—MASS. Brit. Fung. Fl. II, 230, 1893—W. G. SM. Brit. Basid. 130, 1908—RICKEN, Blätterp. 200, pl. 56, f. 4, 1915—KAUFFM. Agar. Mich. 311, 1918—LANGE, Agar. Denm. IV, 10, 1921—REA, Brit. Basid. 123, 1922—OVERH. North Amer. Fl. X, 273, 1924; Ann. Mo. Bot. Gard. XIV, 134, 1927—BRES. Icon. Myc. XV, pl. 705, f. 1, 1930.

Agaricus unicolor VAHL, Fl. Dan. Fasc. 18, 7, pl. 1071, f. 1, 1792 (teste FR.).

Agaricus (Pholiota) unicolor FR. Epicr. Myc. 170, 1838; Hymen. Eur. 225, 1874—CKE. Ill. Brit. Fung. pl. 356, f. B, 1886—WINT. Die Pilze, I, 696, 1884.

Dryophila (Pholiota) unicolor QUÉL. Ench. Fung. 69, 1886.

Subcaespitose or gregarious. Pileus 0.5–3 cm. broad, campanulate to conico-campanulate or somewhat convex, often sharply umbonate; surface cinnamon-buff to ochraceous-buff or ochraceous-orange,

glabrous, hygrophanous, margin densely striatulate or fluted; context thin, concolorous, taste somewhat farinaceous, odour subearthy; lamellae squarely adnate, often becoming somewhat free with the expansion of the pileus, rather crowded, sub-triangular in shape, subconcolorous with the pileus; stipe 2.5–5 cm. long, 2–4 mm. thick, equal, subconcolorous or bister brown at the base, decidedly floccose-mealy above the annulus, fibrillose below or the base white-tomentose, hollow; annulus persistent, median or superior, upright, funnel-shaped, pallid; spores deep ochraceous *in* mass, ovoid or ellipsoidal, smooth or slightly rough when matured, 7.5–10 × 5–6 μ; cystidia rare, projecting, flask-shaped or subfusoid with ventricose base, hyaline, pointed.

Hab. *on* rotten wood of coniferous or deciduous trees. Summer to autumn. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America.

Jap. name. *Hime-ichimegasa-take* (n. n.).

Tribe **Cortinarieae** IMAI, nom. nov.

Cortinariées KONR. et MAUBL. Icon. Sel. Fung. 28 & 122, 1924, *pro maj. parte.*

Fructificatio carnosa, cum velo arachnoideo vel marginato. Pileus cum stipite carnosi confluentus et homogeneus. Lamellae molles, carnosae, cum stipite adhaerentes.

Key to the genera.

I. With an arachnoidal or filamentous and dry or viscid veil.
  A. Veil forming an arachnoidal, fugacious annulus on the stipe .... *Cortinarius.*
  B. Veil concrete with the epidermis of the pileus .... *Inocybe.*
II. With a fugacious, viscid or dry veil, or none.
  A. Lamellae sinuate or adnexed .... *Hebeloma.*
  B. Lamellae decurrent or adnate with a decurrent tooth ...... *Gymnopilus.*

Cortinarius **FR.**

Epicr. Myc. 255, 1838.

Agaricus § *Cortinaria* PERS. Syn. Fung. 276, 1801, pro parte.

Cortinaria S. F. GRAY, Nat. Arr. Brit. Pl. I, 627, 1821.

Agaricus § *Telamonia* FR. Syst. Myc. I, 210, 1821.
Agaricus § *Inoloma* FR. Ibid. 216, 1821.
Agaricus § *Phlegmacium* FR. Ibid. 226, 1821.
Agaricus § *Dermocybe* FR. Ibid. 227, 1821.
Agaricus § *Myxacium* FR. Ibid. 247, 1821.
Cortinarius § *Plegmacium* FR. Epicr. Myc. 256, 1838.
Cortinarius § *Myxacium* FR. Ibid. 273, 1838.
Cortinarius § *Inoloma* FR. Ibid. 278, 1838.
Cortinarius § *Dermocybe* FR. Ibid. 283, 1838.
Cortinarius § *Telamonia* FR. Ibid. 291, 1838.
Cortinarius § *Hydrocybe* FR. Ibid. 303, 1838.
Dermocybe FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 372, 1889.
Hydrocybe FAYOD, Ibid. 372, 1889.
Telamonia FAYOD, Ibid. 373, 1889.
Myxacium FAYOD, Ibid. 374, 1889.
Sphaerotrachys FAYOD, Ibid. 374, 1889.
Phlegmacium FAYOD, Ibid. 375, 1889.
Inoloma KARST. Medd. Soc. Faun. Fl. Fenn. XVIII, 70, 1891.
Hydrocybium EARLE, Bull. N. Y. Bot. Gard. V, 440, 1909.
Bulbopodium EARLE, Ibid. 441, 1909.

Fructification with or without universal veil, and with cortina. Pileus fleshy, regular, confluent and homogeneous with fleshy stipe. Stipe central, fleshy. Lamellae adnate, sinuate or decurrent. Universal veil present or lacking, usually evanescent, either gelatinous or filiform-interwoven in texture. Spores cinnamon-brown or ferruginous in mass.

Type species: *Agaricus violaceus* L. ex FR.

Key to the subgenera, Sections and species in Hokkaido.

I. Universal veil glutinous; pileus fleshy, glutinous, somewhat thin; stipe scarcely bulbous, viscid; lamellae adnate or decurrent. . Subgen. Myxacium.

   A. Stipe floccoso-peronate, the flocci at first covered with gluten. . . . . Sect. Colliniti.

      1. Pileus clay-brown, radiately wrinkled; stipe usually long and ventricose. . . . . *C. elatus* (1).

   B. Stipe not floccoso-peronate, viscid, with a varnished appearance when dry, veil entirely viscid. . . . . Sect. *Delibuti.*

      1. Lamellae pallid at first then pale ochraceous-cinnamon; pileus yellow or orange-yellow; stipe pure white. . . . . . . *C. vibratilis* (2).

      2. Lamellae violaceous at first then gray-cinnamon; pileus dark-violet; stipe violaceous. . . . . *C. iodes* (3).

II. Partial veil arachnoidal, dry; pileus equally fleshy, viscid; stipe firm, dry.. Subgen. Phlegmacium.

A. *Partial veil superior, ring-likely pendulous from the apex of the* subequal or clavate stipe.......................... Sect. Cliduchii.

1. Lamellae at first yellow, then cinnamon or ferruginous; pileus tan-color; stipe white............................ *C. latus*(4).

2. Lamellae at first olivaceous, then concolorous; pileus dark-olive; stipe concolorous........................... *C. infractus*(5).

B. Bulb of the base of the stipe depressed or turbinate, marginate; stipe fleshy, fibrous; cortina arising from the margin of the bulb, commonly inferior; pileus equally fleshy; lamellae subsinuate..... Sect. Scauri.

1. Lamellae whitish, then clay colored or pale cinnamon; pileus ochraceous-buff, becoming clay-color; stipe whitish, becoming yellowish................................ *C. multiformis*(6).

2. Lamellae violaceous, dark-blue or purplish, at length cinnamon.

a. Pileus light mouse-gray; lamellae white then bluish, finally cinnamon; stipe concolorous........... *C. caesiocyaneus*(7).

b. Pileus dark-purplish-umber, then discolored and variegated with clay color; lamellae azure-blue at first; stipe pallid azure-blue; context becoming purple when bruised.. *C. purpurascens*(8).

3. Lamellae yellow at first, finally ferruginous; pileus orange-fulvous; stipe yellow.......................... *C. fulgens*(9).

C. Cortina simple, thin, fugacious, median or inferior; stipe at first exserted, somewhat thin, rigid-elastic, never marginato-bulbous nor peronate, externally subcartilaginous, polished, shining, naked at the apex; pileus thin, often hygrophanous............... Sect. Elastici.

1. *Lamellae whitish or grayish lavender, then clay color or dirty* cinnamon; pileus cinnamon; stipe whitish.... *C. decoloratus*(10).

III. Pileus equally fleshy, dry, at first silky with innate scales or fibrils, becoming smooth, flesh continuous, not hygrophanous; veil simple; stipe fleshy, subbulbous................................ Subgen. Inoloma.

A. Lamellae, as well as stipe and veil, violaceous; pileus, stipe and lamellae dark violaceous....................... *C. violaceus*(11).

IV. Pileus thin and equally fleshy, at first silky with subinnate villose down, becoming glabrous when old, dry, not hygrophanous; flesh watery or colored when moist; stipe equal or attenuated, externally rigid-elastic or fragile, internally stuffed or hollow; veil simple, fibrillose.. Subgen. Dermocybe.

A. Lamellae bright cinnamon, red or yellow; stipe and cortina fibrillose, colored.

1. Pileus convex or obtusely umbonate.

a. Pileus cinnamon; lamellae yellow at first; stipe yellow.. *C. cinnamomeus*(12).

b. Pileus, lamellae and stipe dark blood-red.. *C. sanguineus*(13).

2. Pileus conico-campanulate, persistently acute; fulvous-cinnamon; stipe and lamellae yellowish at first......... *C. croceoconus*(14).

V. *Pileus moist, hygrophanous*, at first glabrous or besprinkled with superficial whitish fibers of the veil, thin fleshed or abruptly thin at the margin, splitting; stipe annulate from the inferior universal veil or peronate with scales, subcortinate at the apex, hence the veil is somewhat double.................................... Subgen. Telamonia.

A. Lamellae very broad, rather thick, more or less distant; stipe spongy or wholly fibrous............................... Sect. Mollipodes.

1. Pileus brick-colored, hoary with very small squamules; stipe whitish.................................. *C. macropus*(15).

VI. Pileus glabrous or wholly covered with white superficial fibrils, not viscid, but moist when fresh, changing color when dry; context very thin or scissile, rarely more compact in the disc; stipe slightly rigid, not peronate; cortina thin, fibrillose, rarely collasping and forming an irregular zone on the stipe.................................. Subgen. Hydrocybe.

A. Pileus subfleshy convex or campanulate-convex, then expanded, obtuse or at length gibbous, margin at first incurved; stipe for the most part attenuated upward.......................... Sect. Firmiores.

1. Pileus watery cinnamon or tawny-cinnamon; cortina white and fugacious; stipe brownish.................. *C. jubarinus*(16).

B. Pileus submembranous, conical then expanded, umbonate, umbo acute, or rarely obtuse or indistinct, margin straight at first; stipe subequal or attenuated toward the base.................... Sect. Tenuiore.

1. Pileus acutely umbonate, brick colored; stipe paler, fibrillosely fissile...................................... *C. fasciatus*(17).

Subgen. Myxacium Fr.

Epicr. Myc. 273, 1838.

Agaricus § *Myxacium* Fr. Syst. Myc. I, 247, 1821.
Myxacium Fayod, Ann. Sci. Nat., Bot. 7 sér. IX, 374, 1889.

Pileus fleshy, glutinous, somewhat thin. Stipe scarcely bulbous, scid. Lamellae adnate or decurrent. Veil universal glutinous.

Sect. Colliniti Fr.

Epicr. Myc. 273, 1838.

Stipe floccoso-peronate, the flocci at first covered with gluten.

1. *Cortinarius (Myxacium) elatus* (PERS. ex FR.) SACC.

Fl. Ital. Crypt., Hymen. 605, 1916.

Agaricus elatus PERS. Syn. Fung. 332, 1801 (teste FR.).

Agaricus (Myxacium) elatus FR. Syst. Myc. I, 248, 1821.

Cortinarius (Myxacium) elatior FR. Epicr. Myc. 274, 1838; Hymen. Eur. 355, 1874—BERK. Outl. Brit. Fung. 186, 1860—CKE. Handb. Brit. Fung. I, 177, 1871; Ill. Brit. Fung. pl. 741, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 167, 1872; Ench. Fung. 78, 1886—GILL. Hymen. Fr. 456, cum icone, 1874—KARST. Hattsv. I, 334, 1879—SACC. Syll. Fung. V, 917, 1887—MASS. Brit. Fung. Fl. II, 87, 1893—W. G. SM. Brit. Basid. 223, 1908—KAWAMURA, Ill. Jap. Fung. pl. 7, f. 18–20, 1913—REA, Brit. Basid. 150, 1922—KAUFFM. North Amer. Fl. X, 290, 1932—LANGE, Agar. Denm. X, 22, 1935.

[SHIRAI, List Jap. Fung. ed. 2, 175, 1917; ed. 3, 104, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 115, 1931]

Myxacium elatius RICKEN, Blätterp. 124, pl. 35, f. 1, 1915.

Gregarious or solitary, edible. Pileus 5–10 cm. broad, campanulate or obtusely conical, then expanded to discoid or subumbonate; surface viscid, olive-ocher to medal-bronze when moist, darker at the disk, fading to dingy-yellowish-ocher, radiately wrinkled with coarse grooves on the submembranous margin; context whitish or yellowish, soft, thin except the disk, odour and taste mild; lamellae adnate or adnexed, at first pale-campanula-blue, then cinnamon, finally becoming much darker, crowded, broad, the edge remaining bluish longer, then white-flocculose; stipe 7–15 cm. long, 1–2 cm. or more thick, ventricose-elongate, attenuated toward both ends, deeply imbedded in humus and soil, sheathed at first by a viscid, pale-campanula-blue, adpressed, subfloccose universal veil, white at the apex and base, striate-sulcate above the sheath, solid; cortina concolorous, viscid, fugacious; spores ferruginous in mass, almond-shaped, coarsely tuberculate, 12–15 × 7–9 μ.

Hab. on humus ground among fallen leaves. Autumn. Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Abura-shimeji* (KAWAMURA).

Sect. Delibuti FR.

Epicr. Myc. 275, 1838.

Stipe not floccoso-peronate, viscid, with a varnished appearance when dry, veil entirely viscid.

2. *Cortinarius* (*Myxacium*) *vibratilis* Fr.

Epicr. Myc. 277, 1838; Hymen. Eur. 358, 1874—Quél. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 351, 1872; Ench. Fung. 79, 1886—Gill. Hymen. Fr. 459, cum icone, 1874—Karst. Hattsv. I, 339, 1879—Sacc. Syll. Fung. V, 922, 1887; Fl. Ital. Crypt., Hymen. 608, 1916—Cke. Ill. Brit. Fung. pl. 744, 1888—Schroet. Pilze Schles. I, 597, 1889—Mass. Brit. Fung. Fl. II, 92, 1893—W. G. Sm. Brit. Basid. 224, 1908—Kauffm. Agar. Mich. 333, 1918; North Amer. Fl. X, 293, 1932—Rea, Brit. Basid. 152, 1922—Bres. Icon. Myc. XIII, pl. 633, 1930—Lange, Agar. Denm. X, 25, 1935.

Agaricus (*Phlegmacium*) *vibratilis* Fr. Syst. Myc. I, 227, 1921.

Cortinarius (*Phlegmacium*) *amarus* Pk. 32 Ann. Rep. N. Y. State Mus. 30, 1880 (teste Kauffm.).

Myxacium amarum Pk. 1 Bull. N. Y. State Mus. 14, 1888.

Myxacium vibratile Ricken, Blätterp. 127, pl. 35, f. 2, 1915.

Gregarious or solitary. Pileus 2–5 cm. broad, campanulate or convex, then expanded to gibbous or subumbonate; surface glabrous, even, with a very glutinous pellicle, hygrophanous, yellow or bright orange-yellow, paler and shining when dry; context soft, thin except disk, white or pallid, taste bitter; lamellae adnate or decurrent by a tooth, pallid or yellowish, then pallid ochraceous-cinnamon, crowded, thin, rather narrow; stipe 3–8 cm. long, 4–10 mm. thick, nearly equal or slightly attenuated upwards, but subfusiformly thickened at the base, pure white, shining, clothed when young by a glutinous, hyaline, universal veil which soon dries, often viscid only at the base, soft, stuffed; cortina glutinous, fibrous, white, fugacious; spores ferruginous in mass, ovate, coarsely verrucose, about $10 \times 7.5\,\mu$.

Hab. on the ground in woods. Autumn. Kitami (Oketo forest).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Ki-aburashimeji* (n. n.).

3. *Cortinarius* (*Myxacium*) *iodes* Berk. et Curt.

Ann. Mag. Nat. Hist. 2 ser. XII, 423, 1853—Sacc. Syll. Fung. V, 920, 1887—Kauffm. Agar. Mich. 335, 1918; North Amer. Fl. X, 294, 1932.

Solitary, gregarious or subcaespitose. Pileus 2–5 cm. broad, campanulate-convex, then expanded; surface glabrous, even, with viscid, separable pellicle, dark-violet to purplish, at length often yellowish at the disk; context thick at the disk, thin on the margin, violaceous, then paler, taste and odour none; lamellae adnate, crowded,

moderately broad, violaceous at first, then gray-cinnamon, fuscous-ferruginous in dried specimens; stipe 5–7 cm. long, 4–10 mm. thick, equal or slightly attenuated upward, viscid, fibrillose, violaceous, solid; cortina pale olivaceous; spores ferruginous in mass, broadly ellipsoidal, verrucose, 8–10 × 5–6 μ.

Hab. on the ground in woods. Autumn. Oshima (Ônomura).

Distr. Japan (Hokkaido), North America.

Jap. name. *Murasaki-aburashimeji* (n. n.).

Subgen. **Phlegmacium** FR.

Epicr. Myc. 256, 1838.

Agaricus § *Phlegmacium* FR. Syst. Myc. I, 226, 1821.
Phlegmacium FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 375, 1889.

Pileus equally fleshy, viscid. Stipe firm, dry. Partial veil arachnoidal, dry.

Sect. **Cliduchii** FR.

Epicr. Myc. 256, 1838.

Partial veil superior, ring-like pendulous from the apex of the subequal or clavate stipe.

4. ***Cortinarius (Phlegmacium) latus*** [PERS.] FR.

Epicr. Myc. 260, 1838; Hymen. Eur. 340, 1874—GILL. Hymen. Fr. 468, 1874—KARST. Hattsv. I. 313, 1879—QUÉL. Ench. Fung. 73, 1886—SACC. Syll. Fung. V, 895, 1887; Fl. Ital. Crypt., Hymen. 588, 1916—REA, Brit. Basid. 137, 1922—BRES. Icon. Myc. XIII, pl. 609, 1930.

Agaricus latus PERS. Syn. Fung. 276, 1801 (teste FR.).
Agaricus (*Telamonia*) *latus* FR. Syst. Myc. I, 215, 1821.
Phlegmacium latum RICKEN, Blätterp. 141, 1915.

Gregarious, edible. Pileus 6–10 cm. broad, convex, then expanded, obtuse; surface tan color, disc darker, slightly viscid, soon dry, fibrillose, then glabrous; context white or yellowish, taste mild, odour pleasant; lamellae emarginate, pallid, then clay-cinnamon, crowded, distantly dentate, 6 mm. broad; stipe 5–7 cm. long, 1–2 cm. thick, equal, base ovately bulbous, rarely emarginately bulbous, white,

somewhat squarrose, then fibrillose; cortina white, superior, forming an annulus, fugacious; spores ochraceous in mass, oblong-ellipsoidal, about 10 × 5–6 μ, minutely rough.

Hab. on the ground in woods. Autumn. Ishikari (environs of Sapporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Cha-ôfûsentake* (n. n.).

5. *Cortinarius (Phlegmacium) infractus* [PERS.] FR.

Epicr. Myc. 261, 1838; Hymen. Eur. 341, 1874—QUÉL. Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 350, 1873; Ench. Fung. 74, 1886—GILL. Hymen. Fr. 467, 1874—KARST. Hattsv. I, 314, 1879—SACC. Syll. Fung. V, 896, 1887; Fl. Ital. Crypt., Hymen. 587, 1916—CKE. Ill. Brit. Fung. pl. 704, 1888—SCHROET. Pilze Schles. I, 601, 1889—MASS. Brit. Fung. Fl. II, 101, 1893—W. G. SM. Brit. Basid. 217, 1908—KAUFFM. Agar. Mich. 365, pl. 73, 1918; North Amer. Fl. X, 308, 1932—REA, Brit. Basid. 138, 1922—BRES. Icon. Myc. XIII, pl. 610, 1930—LANGE, Agar. Denm. X, 21, 1935.

Agaricus infractus PERS. Obs. Myc. II, 42, 1799; Syn. Fung. 283, 1801 (teste FR.).

Agaricus (Inoloma) infractus FR. Syst. Myc. I, 223, 1821.

Cortinarius anfractus FR. Epicr. Myc. 262, 1838; Hymen. Eur. 341, 1874—CKE. Handb. Brit. Fung. I, 173, 1871; Ill. Brit. Fung. pl. 705, 1888—QUÉL. Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 350, 1873—GILL. Hymen. Fr. 468, 1874—MASS. Brit. Fung. Fl. II, 101, 1893—W. G. SM. Brit. Basid. 217, 1908.

Phlegmacium infractum RICKEN, Blätterp. 143, pl. 43, f. 2, 1915.

Gregarious. Pileus 5–10 cm. broad, convex, then expanded, gibbous; surface viscid when moist, glabrous, even, dark-olive or sooty-olive, then becoming fulvous, often fuscous-zoned near the margin, margin undulate and broken, often finally revolute; context whitish, somewhat tinged with blue at the apex of the stipe, firm, thick, odour somewhat nauseous, taste bitterish; lamellae sinuate-adnexed or sometimes emarginate, crowded or subdistant, undulate-crisped, subconcolorous with the pileus, at length becoming umber; stipe 4–8 cm. long, 8–15 mm. or more thick, ovate-clavate or elongate and subbulbous, rather stout, subconcolorous, adpressedly fibrillose, often tinged violaceous at the apex, solid; cortina subolivaceous, fugacious; spores ferruginous in mass, 10–12.5 × 6–7.5 μ, broadly ellipsoidal or subovate, verrucose.

Hab. on the ground in woods, mostly in mixed woods. Autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Yabure-ôfûsentake* (n. n.).

Sect. Scauri FR.

Epicr. Myc. 262, 1838.

Pileus equally fleshy. Lamellae subsinuate. Stipe fleshy, fibrous, bulb of the base depressed or turbinate, marginate.

6. *Cortinarius (Phlegmacium) multiformis* FR.

Epicr. Myc. 263, 1838; Hymen. Eur. 343, 1874—BERK. Outl. Brit. Fung. 184, 1860—CKE. Handb. Brit. Fung. I, 174, 1871; Ill. Brit. Fung. pl. 708, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D' Emul. Montb. 2 sér. V, 164, 1872; Ench. Fung. 74, 1886—GILL. Hymen. Fr. 466, 1874—KARST. Hattsv. I, 315, 1879—SACC. Syll. Fung. V, 898, 1887; Fl. Ital. Crypt.. Hymen. 589, 1916—SCHROET. Pilze Schles. I, 601, 1889—MASS. Brit. Fung. Fl. II, 102, 1893—KAUFFM. Agar. Mich. 357, pl. 72, 1918; North Amer. Fl. X, 302, 1932—REA, Brit. Basid. 138, 1922—KONR. & MAUBL. Icon. Sel. Fung. pl. 114, 1928—LANGE, Agar. Denm. X, 14, 1935.

[KAWAMURA, Jap. Fungi, no. 132, 1929]

Agaricus turbinatus SOWERB. Engl. Fung. pl. 102, 1797 (teste FR.).

Agaricus multiformis FR. Obs. Myc. II, 63, 1818.

Agaricus (Inoloma) varius FR. Syst. Myc. I, 225, 1821, *pro parte*.

Phlegmacium multiforme RICKEN, Blätterp. 136, pl. 39, f. 1, 1915.

Gregarious, edible. Pileus 5–10 cm. broad, convex, then expanded to gibbous or nearly plane; surface viscid when moist, ochraceous-buff, becoming clay-color, sometimes besprinkled with white, fugacious fragments of the universal veil; context white, becoming slightly discolored; odour and taste mild; lamellae emarginate or adnexed, crowded, at first whitish, then argillaceous, finally subferruginous, serrulate on the edge; stipe 5–10 cm. long, 1–2 cm. thick, equal or attenuated upward, with a somewhat emarginate bulb at the base, at first white, then yellowish, adpressedly fibrillose, solid; cortina white, fibrillose, fugacious; spores ochraceous-tawny in mass, ellipsoidal, 8–10 × 5–6 μ, slightly rough.

Hab. on the ground in woods, mostly in coniferous or mixed. Autumn. Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), Europe, North America.
Jap. name. *Manjûgasa* (KAWAMURA).

7. *Cortinarius (Phlegmacium) caesiocyaneus* BRITZ.

Bot. Centralbl. LXII, 307, 1895, nom. nud.; Ibid. LXXX, 58, 1899, pro parte—R. MAIRE, Bull. Soc. Myc. Fr. XXVI, 176, f. 5, pl. 8, f. 1–2, 1910—KAUFFM. Agar. Mich. 342, 1918; North Amer. Fl. X, 297, 1932—REA, Brit. Basid. 140, 1922.

Solitary. Pileus 5–7 cm. broad, convex, then expanded; surface pallid-mouse-gray to light-mouse-gray or light quaker drab, smooth, glabrous, viscid when wet, spotted with warm-buff or pinkish-buff, margin incurved at first, then repand and wavy, pellicle separable; context thick, whitish, not changing in color when bruised, taste and odour mild; lamellae adnexed, whitish then bluish, finally cinnamon, crowded, 4 mm. broad, edge wavy and serrulate; stipe 5–7 cm. long, 1–1.3 cm. thick, subequal or slightly attenuated upward, base bulbous, reaching to 3 cm. thick and 2 cm. high, marginate, fibrillose from the cortina, concolorous, the bulbous base covered with whitish or purplish, volvate, very thin membrane, stuffed or nearly hollow; cortina whitish or purplish, fibrillose, fugacious; spores cinnamon in mass, ellipsoidal or nearly short fusiform, verrucose, 9–12.5 × 5–6.5 μ.

Hab. among the fallen needles of conifers. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America.
Jap. name. *Asagi-fûsentake* (n. n.).

8. *Cortinarius (Phlegmacium) purpurascens* FR.

Epicr. Myc. 265, 1838; Hymen. Eur. 345, 1874—BERK. Outl. Brit. Fung. 185, 1860—CKE. Handb. Brit. Fung. I, 175, 1871; Ill. Brit. Fung. pl. 723–724, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 165, 1872; Ench. Fung. 75, 1886—GILL. Hymen. Fr. 464, cum icone, 1874—KARST. Hattsv. I, 319, 1879—SACC. Syll. Fung. V, 902, 1887; Fl. Ital. Crypt., Hymen. 598, 1916—SCHROET. Pilze Schles. I, 600, 1889—MASS. Brit. Fung. Fl. II, 106, 1893—W. G. SM. Brit. Basid. 218, 1908—KAWAMURA, Ill. Jap. Fung. pl. 4, f. 7–10, 1912—KAUFFM. Agar. Mich. 345, pl. 71, 1918; North Amer. Fl. X, 297, 1932—REA, Brit. Basid. 141, 1922—BRES. Icon. Myc. XIII, pl. 619, 1930—LANGE, Agar. Denm. X, 14, 1935.

[SHIRAI, List Jap. Fung. ed. 2, 175, 1917; ed. 3, 104, 1927—YASUDA, Bot. Mag. (Tokyo), XXXVIII, (148), 1924]

Agaricus purpurascens FR. Obs. Myc. II, 70, 1818.
Phlegmacium purpurascens RICKEN, Blätterp. 130, pl. 36, f. 3, 1915.

Gregarious, solitary or subcaespitose, edible. Pileus 5–10 cm. or more broad, convex then expanded, obtuse; surface glabrous, viscid, dark-purplish-umber or entirely violet-purple when young, soon discolored and variegated with clay color or brown, margin long left violaceous, at first inflexed; context thick, tinged azure or purplish color, fading to whitish in age, taste and odour mild; lamellae emarginate or rounded-adnexed, crowded, at first azure-blue, then argillaceous to cinnamon, changing to deep purple when bruised; stipe 4–8 cm. long, 1–2 cm. thick, usually short and stout, nearly equal, with a subemarginate or marginate bulb at the base, pallid azure-blue, becoming darker when bruised, fibrillose, solid; cortina fibrillose, violaceous, fugacious; spores ferruginous in mass, broadly ellipsoidal, 10–12 × 6–7.5 μ, verrucose.

Hab. on the ground in woods, mostly coniferous or mixed. Autumn. Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Fûsen-take* (KAWAMURA).

9. *Cortinarius (Phlegmacium) fulgens* [ALB. et SCHW.] FR.

Epicr. Myc. 267, 1838; Hymen. Eur. 347, 1874—CKE. Handb. Brit. Fung. I, 176, 1871; Ill. Brit. Fung. pl. 716, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 165, 1872; Ench. Fung. 75, 1886—GILL. Hymen. Eur. 462, cum icone, 1874—KARST. Hattsv. I, 321, 1879—SCHROET. Pilze Schles. I, 599, 1889—MASS. Brit. Fung. Fl. II, 108, 1893—W. G. SM. Brit. Basid. 219, 1908—ROLLAND, Atlas Champ. 64, f. 145, 1910—KAUFFM. Agar. Mich. 354, 1918; North Amer. Fl. X, 301, 1932—REA, Brit. Basid. 142, 1922—LANGE, Agar. Denm. X, 16, 1935.
Agaricus fulgens ALB. et SCHW. Consp. Lus. 160, 1805 (teste FR.).
Phlegmacium fulgens RICKEN, Blätterp. 135, 1915.

Gregarious, edible. Pileus 5–10 cm. or more broad, broadly convex, then expanded to nearly plane; surface orange-fulvous or orange-yellow, darker at the center, paler on the margin, viscid when wet, fibrillose or somewhat virgate-streaked or squamulose; context thick, yellowish, then alutaceous, odour and taste mild; lamellae emarginate, broad, crowded, yellow or deep yellow, then tawny, finally ferruginous; stipe 4–8 cm. long, 1.5–2 cm. thick, equal, with large, marginate-depressed bulb at the base, yellow, paler above, densely

covered with rusty stained fibrils of the cortina, solid; spores ferruginous in mass, almond-shaped, verrucose, apiculate at both ends, 15–18 × 8–10 μ.

Hab. on the ground in woods, mostly coniferous or mixed. Autumn. Kitami (Oketo forest).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Kogane-fûsentake* (n. n.).

Sect. **Elastici** FR.

Epicr. Myc. 269, 1838.

Pileus thin, often hygrophanous. Stipe at first exserted, somewhat thin, rigid-elastic, never marginate-bulbous nor peronate, externally subcartilaginous, polished, shining, naked at the apex, more often hollow.

10. ***Cortinarius* (*Phlegmacium*) *decoloratus*** FR.

Epicr. Myc. 270, 1838; Hymen. Eur. 351, 1874—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 166, 1872; Ench. Fung. 76, 1886—GILL. Hymen. Fr. 475, cum icone, 1874—KARST. Hattsv. I, 327, 1879—SACC. Syll. Fung. V, 911, 1887; Fl. Ital. Crypt., Hymen. 602, 1916—CKE. Ill. Brit. Fung. pl. 729, 1888—SCHROET. Pilze Schles. I, 598, 1889—MASS. Brit. Fung. Fl. II, 113, 1893—W. G. SM. Brit. Basid. 221, 1908—KAUFFM. Agar. Mich. 365, 1918; North Amer. Fl. X, 308, 1932—REA, Brit. Basid. 146, 1922.

Agaricus (*Inoloma*) *decoloratus* FR. Syst. Myc. I, 224, 1821.

Phlegmacium decoloratum RICKEN, Blätterp. 145, 1915.

Cortinarius (*Dermocybe*) *decoloratus* LANGE, Agar. Denm. X, 31, 1935.

Gregarious or solitary. Pileus 4–6 cm. broad, convex, then plane or subumbonate; surface cinnamon or orange-cinnamon on the disk, paler on the margin, slightly viscid; context at first purplish, then whitish, thick, odour not strong, taste mild; lamellae adnexed or emarginate, grayish-lavender at first, then light cinnamon-drab, finally cinnamon, subcrowded; stipe 5–7 cm. long, 4–8 mm. thick, equal or enlarged at the base, white with paler violaceous tint and brownish fibrils, then becoming slightly darker; cortina white, fibrillose, fugacious; spores cinnamon in mass, subglobose or subovate, punctate-verrucose, 7–8 × 5–6 μ.

Hab. on humus ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Cha-fûsentake* (n. n.).

The writer with some hesitation refers the fungus in hand to the above mentioned species, *C. decoloratus*, because in the color of pileus and lamellae there are darker and violet hues respectively, than those of the European and American specimens.

Subgen. Inoloma FR.

Epicr. Myc. 278, 1838.

Agaricus § *Inoloma* FR. Syst. Myc. I, 216, 1821.

Inoloma KARST. Medd. Soc. Faun. Fl. Fenn. XVIII, 70, 1891.

Pileus equally fleshy, dry, at first silky with innate scales or fibrils, becoming smooth, flesh continuous, not hygrophanous. Veil simple. Stipe fleshy, subbulbous.

11. *Cortinarius (Inoloma) violaceus* [L.] FR.

Epicr. Myc. 279, 1838; Hymen. Eur. 360, 1874—BERK. Outl. Brit. Fung. 187, 1860—KICKX, Fl. Crypt. Flandr. II, 191, 1867—CKE. Handb. Brit. Fung. I, 179, 1871—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 168, 1872; Ench. Fung. 79, 1886—GILL. Hymen. Fr. 477, cum icone, 1874—KARST. Hattsv. I, 342, 1879—SACC. Syll. Fung. V, 924, 1887; Fl. Ital. Crypt., Hymen. 619, 1916—SCHROET. Pilze Schles. I, 596, 1889—MASS. Brit. Fung. Fl. II, 75, 1893—W. G. SM. Brit. Basid. 226, 1908—KAUFFM. Agar. Mich. 380, 1918; North Am. Fl. X, 312, 1932—REA, Brit. Basid. 155, 1922—BRES. Icon. Myc. XIII, pl. 635, 1930.

Agaricus violaceus L. Sp. Pl. 1173, 1753.

Agaricus (Cortinaria) violaceus PERS. Syn. Fung. 277, 1801 (teste FR.).

Agaricus (Cortinaria) hercynicus PERS. Ibid. 278, 1801 (teste FR.).

Agaricus (Inoloma) violaceus FR. Syst. Myc. I, 217, 1821.

Inoloma violaceum RICKEN, Blätterp. 149, pl. 44, f. 4, 1915.

Solitary or scattered, edible. Pileus 5–10 cm. broad, convex, obtuse, subexpanded, regular; surface dry, dark violet, covered with villose, minute, suberect tufts or scales, at length metallic-shining, margin at first involute; context rather thick, varying gray or blue to dark-violet, not becoming purple when bruised, taste and odour mild; lamellae adnate, becoming sinuate or emarginate, very dark violet, then colored ferruginous with the spores and again violaceous when these are rubbed off, thick, broad, distant, connected by veins; stipe 6–10 cm. long, 1–2 cm. thick, long and stout, clavate or clavate-bulbous at the base, at first tomentose, then fibrillose, dark violet, violaceous

within; cortina azure blue, wooly, then ferruginous with the spores; spores ferruginous in mass, broadly ellipsoidal, $12–15 \times 8–10\mu$, verrucose.

Hab. on the ground among mosses, fallen leaves and debris of coniferous wood. Autumn. Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Murasaki-fûsentake* (n. n.).

Subgen. Dermocybe Fr.

Epicr. Myc. 283, 1838.
Agaricus § *Dermocybe* Fr. Syst. Myc. I, 227, 1821.
Dermocybe Fayod, Ann. Sci. Nat., Bot. 7 sér. IX, 372, 1889.

Pileus thin and equally fleshy, at first silky with subinnate villose down, becoming glabrous when old, dry, not hygrophanous, flesh watery or colored when moist. Stipe equal or attenuated, externally rigid-elastic or fragile, internally stuffed or hollow. Veil simple, fibrillose.

12. *Cortinarius (Dermocybe) cinnamomeus* [L.] Fr.

Epicr. Myc. 288, 1838; Hymen. Eur. 370, 1874—Berk. Outl. Brit. Fung. 190, 1860—Cke. Handb. Brit. Fung. I, 184, 1871; Ill. Brit. Fung. pl. 777–778, 1888—Quél. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 171, 1872; Ench. Fung. 83, 1886—Gill. Hymen. Fr. 487, cum icone, 1874—Karst. Hattsv. I, 357, 1879—Sacc. Syll. Fung. V, 941, 1887; Fl. Ital. Crypt., Hymen. 630, 1916—Schroet. Pilze Schles. I, 593, 1889—Mass. Brit. Fung. Fl. II, 67, 1893—W. G. Sm. Brit. Basid. 232, 1908—Rolland, Atlas Champ. 63, f. 142, 1910—Kauffm. Agar. Mich. 396, 1918; North Amer. Fl. X, 322, 1932—Rea, Brit. Basid. 165, 1922—Bres. Icon. Myc. XIII, pl. 647, 1930—Lange, Agar. Denm. X, 35, 1935.

[P. Henn. Hedw. XXXIX, (156), 1900—Matsum. Ind. Pl. Jap. I, 137, 1904—Shirai, List Jap. Fung. 25, 1905; ed. 2, 175, 1917; ed. 3, 103, 1927]

Agaricus cinnamomeus L. Sp. Pl. 1173, 1753.
Agaricus (Dermocybe) cinnamomeus Fr. Syst. Myc. I, 229, 1821.
Dermocybe cinnamomea Ricken, Blätterp. 160, pl. 47, f. 6, 1915.

Gregarious or subcaespitose. Pileus 2–5 cm. broad, campanulate-convex, then expanded, obtusely umbonate; surface yellowish-cinnamon, or tawny-ochraceous, silky or minutely and densely scaly from the innate or adpressed yellowish fibrils, shining, at length becoming smooth; context yellowish or straw-yellow, rarely deep-yellow, thin,

taste and odour mild; lamellae adnate, varying to adnexed-emarginate or slightly subdecurrent, rather broad, crowded, yellow or bright yellow, then cinnamon, shining; stipe 3–8 cm. long, 3–8 mm. thick, equal, yellowish, citron-yellow or chrome when fresh, darker when handled, fibrillose, stuffed, becoming hollow, olive-cinnamon-yellow within, attached to yellow mycelium; cortina yellowish or citron-yellow, fibrillose; spores dark ochraceous in mass, broadly ellipsoidal, smooth, 6–8 × 4–5 μ.

Hab. on the moist ground among very decayed wood or mosses, in coniferous woods. Autumn. Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Sasa-take* (SHIRAI ex P. HENN.).

13. *Cortinarius (Dermocybe) sanguineus* [WULF.] FR.

Epicr. Myc. 288, 1838; Hymen. Eur. 370, 1874—BERK. Outl. Brit. Fung. 190, 1860—CKE. Handb. Brit. Fung. I, 183, 1871—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 171, 1872; Ench. Fung. 82, 1886—GILL. Hymen. Fr. 485, cum icone, 1874—KARST. Hattsv. I, 356, 1879—SACC. Syll. Fung. V, 940, 1887; Fl. Ital. Crypt., Hymen. 627, 1916—SCHROET. Pilze Schles. I, 593, 1889—MASS. Brit. Fung. Fl. II, 66, 1893—W. G. SM. Brit. Basid. 232, 1908—KAUFFM. Agar. Mich. 402, 1918; North Amer. Fl. X, 321, 1932—REA, Brit. Basid. 164, 1922—BRES. Icon. Myc. XIII, pl. 645, f. 2, 1930—LANGE, Agar. Denm. X, 33, 1935.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 137, 1904—SHIRAI, List Jap. Fung. 25, 1905; ed. 2, 175, 1917; ed. 3, 104, 1927]

Agaricus santalinus SCOP. Fl. Carn. ed. 2, II, 444, 1772 (teste FR.).

Agaricus sanguineus WULF. in JACQ. Coll. II, 107, pl. 15, f. 3, 1788—SOW. Engl. Fung. pl. 43, 1797 (teste FR.).

Agaricus (Dermocybe) sanguineus FR. Syst. Myc. I, 229, 1821.

Dermocybe sanguinea RICKEN, Blätterp. 159, 1915.

Gregarious or scattered. Pileus 2–5 cm. broad, convex, then plane, obtuse or slightly umbonate, sometimes depressed; surface dry, dark blood-red, becoming paler when dry, innately silky or minutely scaly, opaque; context blood-red, thin on margin, pouring out a blood red juice when pressed, odour pleasant, taste mild; lamellae adnate or sinuate, dark blood-red, then rust color, rather broad, crowded; stipe 5–10 cm. long, 3–7 mm. thick, equal or slightly attenuated downward, flexuose, concolorous or darker, clothed with concolorous fibrils,

base sometimes white; cortina blood-red, fibrillose, fugacious; spores pale ferruginous in mass, narrow-ellipsoidal, 7–9 × 4–6 μ, rough.

Hab. on the ground among deep moss or sphagnum in coniferous woods. Autumn. Kitami (Oketo forest), Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Akatake* (SHIRAI ex P. HENN.).

14. *Cortinarius (Dermocybe) croceo-conus* FR.

Monogr. Hymen. Suec. II, 67, 1863; Hymen. Eur. 371, 1874—QUÉL. Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 352, 1873—GILL. Hymen. Fr. 487, cum icone, 1874—SACC. Syll. Fung. V, 942, 1887; Fl. Ital. Crypt., Hymen. 628, 1916—CKE. Ill. Brit. Fung. pl. 780, f. B, 1888—MASS. Brit. Fung. Fl. II, 68, 1893—W. G. SM. Brit. Basid. 232, 1908—KAUFFM. Agar. Mich. 397, 1918—REA, Brit. Basid. 165, 1922.

Gregarious. Pileus 1–3 cm. or more broad, conical, then campanulate, with a persistent acute umbo; surface fulvous-cinnamon, silky, dry, incurved at the margin; context whitish, thin except the umbo; lamellae adnate, ascending, narrow, crowded, yellowish at first, then cinnamon, minutely eroded on the edge; stipe 5–12 cm. long, 2–4 mm. thick, equal, yellowish, fibrillose, stuffed; cortina fibrillose, pale rufous-fulvous, becoming paler; spores ferruginous in mass, ellipsoidal, 8–10 × 4–5 μ, verruculose.

Hab. on the ground in woods. Autumn. Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Ko-kintake* (n. n.).

Subgen. **Telamonia** FR.

Epicr. Myc. 291, 1838.
Agaricus § *Telamonia* FR. Syst. Myc. I, 210, 1821.
Telamonia FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 373, 1889.

Pileus moist, hygrophanous, at first glabrous or besprinkled with superficial whitish fibers of the veil, thinly fleshy or abruptly thin at the margin, splitting. Stipe annulate from the inferior universal veil or peronate with scales, subcortinate at the apex, hence the veil is somewhat double.

Sect. **Mollipodes** Fr.

Epicr. Myc. 291, 1838.

Lamellae very broad, rather thick, more or less distant. Stipe spongy or wholly fibrous.

15. *Cortinarius (Telamonia) macropus* [Pers.] Fr.

Epicr. Myc. 291, 1838; Hymen. Eur. 374, 1874—Gill. Hymen. Fr. 490, 1874—Karst. Hattsv. I, 362, 1879—Quél. Ench. Fung. 84, 1886—Sacc. Syll. Fung. V, 947, 1887—Mass. Brit. Fung. Fl. II, 36, 1893—W. G. Sm. Brit. Basid. 235, 1908—Rea, Brit. Basid. 168, 1922.

Agaricus macropus Pers. Syn. Fung. 275, 1801 (teste Fr.).

Agaricus (Telamonia) macropus Fr. Syst. Myc. I, 215, 1821.

Telamonia macropus Ricken, Blätterp. 168, pl. 50, f. 1, 1915.

Gregarious. Pileus 5–8 cm. or more broad, convex, then expanded, obtuse; surface dry, brick-colored, then becoming ferruginous, hoary with very small squamules, then almost glabrous, margin paler in color and at first incurved; context whitish; lamellae adnexed, pallid then cinnamon, broad, distant, sometimes crenate on the edge; stipe 5–10 cm. or more long, 8–15 mm. or more thick, equal, whitish or subconcolorous, fibrillose, solid; cortina white, forming at first a very thin, membranous annulus, then remaining as a narrow woven annulus; spores ferruginous in mass, broadly ellipsoidal, almost smooth or slightly rough, $8–10 \times 6–7\,\mu$.

Hab. *on the ground in woods. Autumn. Oshima (Ônomura),* Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Nagae-no-fûsentake* (n. n.).

Subgen. **Hydrocybe** Fr.

Epicr. Myc. 303, 1838.

Hydrocybe Fayod, Ann. Sci. Nat., Bot. 7 sér. IX, 372, 1889.

Pileus glabrous or wholly covered with white superficial fibrils, not viscid, but moist when fresh, changing color when dry; flesh very thin, or scissile, rarely more compact in the disk. Stipe slightly rigid, not peronate. Cortina thin, fibrillose, rarely cllasping and forming an irregular zone on the stipe.

Sect. Firmiores Fr.

Epicr. Myc. 303, 1838.

Pileus subfleshy, convex or campanulate-convex, then expanded, obtuse or at length gibbous, margin at first incurved. Stipe for the most part attenuated upward.

16. *Cortinarius* (*Hydrocybe*) *jubarinus* Fr.

Epicr. Myc. 309, 1838; *Hymen. Eur.* 393, 1874—Quél. *Champ. Jura Vosg.* I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 176, 1872; Ench. Fung. 89, 1886—Gill. Hymen. Fr. 507, 1874—Karst. Hattsv. I, 392, 1879—Sacc. Syll. Fung. V, 975, 1887; *Fl. Ital. Crypt.*, Hymen. 652, 1916—Mass. Brit. Fung. Fl. II, 27, 1893—W. G. Sm. Brit. Basid. 246, 1908—Kauffm. Agar. Mich. 436, 1918; North Amer. Fl. X, 343, 1932—Rea, Brit. Basid. 188, 1922.

Hydrocybe jubarina Ricken, Blätterp. 179, 1915.

Gregarious or solitary. Pileus 2–4 cm. broad, campanulate, then flattened, obsoletely umbonate; surface glabrous, even, watery-cinnamon or tawny-cinnamon, subhygrophanous, becoming paler and silky shining when dry, margin at first incurved and white-silky from the cortina; context thin, concolorous, odour and taste none; lamellae adnate, subdistant, brownish, then cinnamon; stipe 3–6 cm. long, 3–5 mm. thick, equal or slightly attenuated upward, pallid at first, then brownish, innately silky-fibrillose, stuffed, then hollow; cortina white, fibrillose, fugacious; spores ferruginous in mass, broadly ellipsoidal, verrucose, $7\text{–}8.5 \times 5\text{–}6.5\ \mu$.

Hab. on the ground in woods, mostly of conifers. Autumn. Kitami (Oketo forest).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Cha-nise-fûsentake* (n. n.).

Sect. Tenuiore Fr.

Epicr. Myc. 310, 1838.

Pileus submembranous, conical then expanded, umbonate, umbo acute or rarely obtuse or indistinct, margin straight at first. Stipe subequal or attenuated toward the base.

17. *Cortinarius (Hydrocybe) fasciatus* [SCOP.] FR.

Epicr. Myc. 315, 1838; Hymen. Eur. 399, 1874—GILL. Hymen. Fr. 511, cum icone, 1874—KARST. Hattsv. 1, 400, 1879—QUÉL. Ench. Fung. 91, 1886—CKE. Ill. Brit. Fung. pl. 814, 1888—SACC. Syll. Fung. V, 982, 1887—SCHROET. Pilze Schles. I, 588, 1889—MASS. Brit. Fung. Fl. II, 35, 1893—W. G. SM. Brit. Basid. 249, 1908—REA, Brit. Basid. 194, 1922—BRES. Icon. Myc. XIV, pl. 670, 1930—LANGE, Agar. Denm. X, 51, 1935.

Agaricus fasciatus SCOP. Fl. Carn. ed. 2, II, 456, 1772, p. p. (teste FR.).

Agaricus acutus (non PERS.) ALB. et SCHW. Consp. Fung. Lus. 166, 1805 (teste FR.).

Hydrocybe fasciata RICKEN, Blätterp. 187, pl. 53, f. 7, 1915.

Gregarious. Pileus 1.5–3 cm. broad, at first acute conical, then expanded, acutely umbonate; surface glabrous, hygrophanous, brick-colored, darker at the umbo, becoming paler and silky when dry; context subconcolorous, thin, tase and odour none; lamellae sinuato-adnate or adnate, pale ochraceous, then cinnamon, subdistant, subventricose; stipe 4–7 cm. long, 2–4 mm. thick, equal, straight or flexuous, paler, with brown fibrous flush, fibrillosely fissile, whitish below, stuffed then hollow; spores ferruginous in mass, ellipsoidal, 8–12 × 5–7 μ, verruculose.

Hab. on the ground in woods, mostly coniferous. Autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Tobicha-nise-fûsentake* (n. n.).

Inocybe (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 178, 1872.

Agaricus § *Inocybe* FR. Syst. Myc. I, 254, 1821.
Astrosporina SCHROET. Pilze Schles. I, 576, 1889.
Agmocybe EARLE, Bull. N. Y. Bot. Gard. V, 439, 1909.
Inocibium EARLE, Ibid. V, 439, 1909.

Fructification with a marginal veil. Pileus fleshy, regular, fibrous, confluent and homogeneous with fleshy stipe. Stipe central, fleshy. Lamellae adnate, sinuato-adnate or adnexed. Spores ochraceous, ferruginous, olivaceous or fuscous in mass.

Type species: *Agaricus rimosus* BULL. ex FR.

Key to the subgenera, and species in Hokkaido.

I. Spores smooth, not angular, nodose, verrucose, nor echinulate .... Subgen. Euinorybe
  A. Cystidia present.
    1. Stipe whitish or pallid; lamellae whitish, then fuscous.
      a. Pileus antimony-yellow to cinnamon-brown...... *I. rimosa* (1).
      b. Pileus white or whitish, sometimes tinged with yellowish or brownish color............................ *I. geophylla* (2).
    2. Stipe colored with fuscous; lamellae umber colored.
      a. Pileus fuscous or bay-brown.................... *I. lacera* (3).

II. Spores angular, nodose, verrucose or echinulate...... Subgen. Astrosporina.
  A. Cystidia present.
    1. Stipe whitish or pallid.
      a. Entirely white.............................. *I. umbratica* (4).
      b. Pileus yellowish-umber.................... *I. praetervisa* (5).
    2. Stipe colored with brown.
      a. Pileus fuliginous-brown...................... *I. plumosa* (6).

Subgen. Euinocybe IMAI, nom. nov.

Agaricus § *Inocybe* Auct. plur. p. p.
Inocybe Auct. plur. p. p.
Inocybe SCHROET. Pilze Schles. I, 584, 1889.

Sporae laeves, nec angulares verrucosaeque, non echinulatae.

1. *Inocybe rimosa* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 180, 1872; Ench. Fung. 96, 1886—GILL. Hymen. Fr. 519, cum icone, 1874—KARST. Hattsv. I, 462, 1879—SACC. Syll. Fung. V, 775, 1887; Fl. Ital. Crypt., Hymen. 736, 1916—SCHROET. Pilze Schles. I, 585, 1889—MASS. Brit. Fung. Fl. II, 194, 1893—W. G. SM. Brit. Basid. 137, 1908—KAWAMURA, Ill. Jap. Fung. pl. 7, f. 1–4, 1913—RICKEN, Blätterp. 111, pl. 30, f. 8, 1915—KAUFFM. Agar. Mich. 455, 1918; North Amer. Fl. X, 249, 1924—REA, Brit. Basid. 195, 1922—BRES. Icon. Myc. XV, pl. 741, 1930.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 148, 1904—SHIRAI, List Jap. Fung. 44, 1905; ed. 2, 299, 1917; ed. 3, 174, 1927]

Agaricus rimosus BULL. Champ. Fr. pl. 388, 1791—PERS. Syn. Fung. 310, 1801—SOW. Engl. Fung. III, pl. 323, 1803 (teste FR.).

Agaricus (*Inocybe*) *rimosus* FR. Syst. Myc. I, 258, 1821; Hymen. Eur. 232, 1874—BERK. in SMITH, Engl. Fl. V, (2), 97, 1836—RABENH. Deut. Krypt. Fl. I, 482, 1844—WINT. Die Pilze, I, 691, 1884—CKE. Ill. Brit. Fung. pl. 384, 1886.

Agaricus (*Hebeloma*) *rimosus* FR. Epicr. Myc. 174, 1838—BERK. Outl. Brit. Fung. 155, pl. 8, f. 5, 1860—CKE. Handb. Brit. Fung. I, 118, 1871.

Gregarious or scattered, poisonous. Pileus 2–7 cm. broad, conical, then campanulate, at length umbonate; surface antimony-yellow to cinnamon-brown, often becoming date-brown when old, darker at the center, dry, innately fibrillose, at first usually even, then becoming longitudinally rimose, sometimes cracked in a tesselated manner, usually remaining even on the center, fibrils buckthorn-brown to cinnamon-brown; context white, thin, odour and taste not unpleasant; lamellae sinuate-adnexed or almost free, whitish at first, then ferruginous, slightly wavy and white fimbriate at the edge, crowded, somewhat ventricose; stipe 5–15 cm. long, 4–8 mm. thick, slightly attenuated upward, subbulbous at the base and up to 1 cm. thick, whitish at first, then scarcely or slightly tinged with ochraceous or brownish tints, innately fibrillose, mealy at the apex, solid; spores ferruginous in mass, ellipsoidal, ventricose, smooth, 9–13 × 5–7 μ; cystidia cylindrical, oblong or clavate, obtuse at the apex, hyaline, abundant on the edge of lamellae.

Hab. on the ground in woods. Late summer to autumn. Ishikari (Nopporo, Mt. Kurodake), Oshima (Ônomura), Tokachi (Lake side of Shikaribetsu), Kushiro (Akan), Kitami (Oketo forest), Nemuro (Ochiishi).

Distr. Japan (Hokkaido, Honshu), Siberia, Europe, North America.

Jap. name. *Dokusugi-take* (SHIRAI ex P. HENN.), *Asetake* (KAWAMURA).

2. *Inocybe geophylla* (SOW. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 182, 1872; Ench. Fung. 97, 1886—GILL. Hymen. Fr. 520, cum icone, 1874—KARST. Hattsv. I, 464, 1879—SACC. Syll. Fung. V, 784, 1887; Fl. Ital. Crypt., Hymen. 727, 1916—SCHROET. Pilze Schles. I, 585, 1889—MASS. Brit. Fung. Fl. II, 199, 1893; Ann. Bot. XVIII, 477, 1904—W. G. SM. Brit. Basid. 140, 1908—RICKEN, Blätterp. 105, pl. 30, f. 2, 1915—KAUFFM. Agar. Mich. 465, 1918; North Amer. Fl. X, 252, 1924—REA, Brit. Basid. 196, 1922—BRES. Icon. Myc. XVI, pl. 752, 1930—HEIM, Inocybe, 139, f. 110, pl. 1, f. 1–2, 1931.

Agaricus geophyllus SOW. Engl. Fung. II, pl. 124, 1799 (teste FR.).

Agaricus (Inocybe) geophyllus FR. Syst. Myc. I, 258, 1821; Hymen. Eur. 235, 1874—BERK. in SMITH, Engl. Fl. V, (2), 98, 1836—RABENH. Deut. Krypt. Fl. I, 482, 1844—WINT. Die Pilze, I, 688, 1884—CKE. Ill. Brit. Fung. pl. 401, 1886.

Agaricus (Hebeloma) geophyllus FR. Epicr. Myc. 176, 1838—BERK. Outl. Brit. Fung. 156, 1860—CKE. Handb. Brit. Fung. I, 119, 1871.

Tricholoma lilacinum GILL. Hymen. Fr. 113, cum icone, 1874.

Gregarious or scattered. Pileus 1–3.5 cm. broad, conical, then expanded to umbonate; surface white or whitish, sometimes tinged with yellowish or brownish color when old, dry, very silky and glossy, then fibrillose, often cracking radially; context white, thin, taste very slightly bitter; lamellae adnate, adnexed or nearly sinuate, becoming almost free, whitish, then pale-grayish-clay color, rather broad, crowded, ventricose; stipe 3–7 cm. long, 2–6 mm. thick, subequal or slightly attenuated upward, slightly thickened at the base, concolorous, silky, floccose or fibrillose external, pruinose at the apex, stuffed; cortina white, scarce, fugacious; spores umber color in mass, ellipsoidal, smooth, inequilateral, 7.5–10 × 5 μ; cystidia moderately thick-walled, hyaline, ventricose-fusiform, abundant on the sides and edge of the lamellae.

Hab. on the ground in woods. Late summer to autumn. Oshima (Ônomura), Ishikari (Nopporo, Mt. Kurodake), Kushiro (Lake side of Akan), Kitami (Oketo forest, Biwaushizawa).

Distr. Japan (Hokkaido), Siberia, Asia Minor, Europe, North America.

Jap. name. *Shiro-tomaya-take* (n. n.).

3. *Inocybe lacera* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 180, 1872; Ench. Fung. 95, 1886—GILL. Hymen. Fr. 516, 1874—KARST. Hattsv. I, 457, 1879—SACC. Syll. Fung. V, 767, 1887; Fl. Ital. Crypt., Hymen. 711, 1916—MASS. Brit. Fung. Fl. II, 187, 1893; Ann. Bot. XVIII, 483, 1904—W. G. SM. Brit. Basid. 135, 1908—RICKEN, Blätterp. 108, pl. 30, f. 4, 1915—KAUFFM. Agar. Mich. 452, 1918; North Amer. Fl. X, 246, 1924—REA, Brit. Basid. 200, 1922—BRES. Icon. Myc. XV, p. 731, 1930—HEIM, *Inocybe*, 239, f. 157–158, pl. 19, f. 1–4, 1931.

Agaricus (*Inocybe*) *lacerus* FR. Syst. Myc. I, 257, 1821; Hymen. Eur. 229, 1874—WINT. Die Pilze, I, 693, 1884—CKE. Ill. Brit. Fung. pl. 583, 1886.

Agaricus (*Hebeloma*) *lacerus* FR. Epicr. Myc. 173, 1838—BERK. Outl. Brit. Fung. 154, 1860—CKE. Handb. Brit. Fung. I, 115, 1871.

Gregarious or solitary. Pileus 2–4 cm. broad, subconical or subcampanulate, then expanded to umbonate; surface at first nearly smooth, soon adpressed-fibrillose, then fibrillose-scaly, becoming ragged around the umbo, fuscous or bone-brown at the umbo, natal brown or drab and having a few cracks on the margin; context whitish, thin, odour and taste none; lamellae adnato-decurrent, grayish at first, then umber, edge white-fimbriate, crowded; stipe 3–

6 cm. long, 2–4 mm. thick, equal or slightly enlarged at the base, concolorous or slightly paler, white powdery at the apex, floccose-scaly below, stuffed then hollow; spores umber in mass, ellipsoidal to subcylindrical, smooth, 10–14 × 5–6.5 μ; cystidia present, fusiform, ventricose, hyaline, smooth or slightly crystalate at the apex.

Hab. on the ground in woods or under trees. Summer to autumn. Ishikari (Sapporo, Mt. Kurodake).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Kuro-tomayatake* (n. n.).

Our fungus has not such distinct squarroso-scales on the pileus as COOKE and BRESADOLA illustrated, and the context and lamellae do not change color to red as in the European fungus. The color is also darker than the European. KAUFFMAN has reported in the American specimen darker color of plant and non reddening of context and lamellae. The spores are very variable in form and size; they vary from typical ellipsoidal or pip shape being about 10 × 5 μ in size to subcylindrical or long ellipsoidal form which are 12.5–14 × 5–6 μ in size.

Subgen. **Astrosporina** IMAI, nom. nov.

Agaricus § *Inocybe* Auct. plur. p. p.
Inocybe Auct. plur. p. p.
Astrosporina SCHROET. Pilze Schles. I, 576, 1889.

Sporae angulares, verrucosae vel echinulatae.

4. ***Inocybe umbratica*** QUÉL.

Champ. Jura Vosg. 12 Suppl., in Assoc. Fr. XII, 500, pl. 6, f. 7, 1883—SACC. Syll. Fung. V, 787, 1887—RICKEN, Blätterp. 101, 1915—BRES. Icon. Myc. XV, pl. 734, f. 2, 1930—KONR. et MAUBL. Icon. Sel. Fung. pl. 104, f. 3, 1930—HEIM, Inocybe, 143, f. 111, 1931.

Inocybe geophila var. *umbratica* QUÉL. Ench. Fung. 97, 1886.

Inocybe commixta BRES. Fung. Trid. I, 53 & 103, pl. 58, f. 2, 1884—SACC. Syll. Fung. V, 787, 1887; Fl. Ital. Crypt., Hymen. 727, 1916.

Inocybe leucocephala BOUD. Bull. Soc. Bot. Fr. XXXII, 282, pl. 9, f. 1, 1885—SACC. Syll. Fung. V, 765, 1887.

Inocybe umbratica var. *leucocephala* QUÉL. Fl. Myc. Fr. 103, 1888.

Inocybe infida MASS. Ann. Bot. XVIII, 467, 1904.

Astrosporina infida REA, Brit. Basid. 209, 1922.

Solitary. Pileus 2–5 cm. broad, conico-campanulate, then expanded to umbonate; surface white or whitish, silky-fibrillose, sometimes rimose, dry, subshining, margin incurved at first, often splitting; context white, odour earthy-nauseous, taste almost none; lamellae sinuate or almost free, very crowded, at first whitish, then ferruginous; stipe 3–6 cm. long, 3–7 mm. thick, subequal, turbinately bulbous at the base, white or whitish, nearly smooth, glabrous, not fibrillose, solid; spores umber in mass, subellipsoidal and angular-tuberculate, 8–10 × 5–7.5 μ; cystidia present, ventricose, hyaline, thick-walled.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo, Mt. Kurodake).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Shiro-nise-tomaya-take* (n. n.).

5. ***Inocybe praetervisa*** QUÉL.

in BRES. Fung. Trid. I, 35, pl. 38, 1883; Champ. Jura Vosg. 12 Suppl., l. c., 500, 1883; Ench. Fung. 96, 1886—SACC. Syll. Fung. V, 782, 1887; Fl. Ital. Crypt., Hymen. 729, 1916—REA, Trans. Brit. Myc. Soc. II, 62, pl. 5, f. 2, 1903—MASS. Ann. Bot. XVIII, 466, 1904—RICKEN, Blätterp. 100, pl. 29, f. 3, 1915—KONR. et MAUBL. Icon. Sel. Fung. pl. 106, 1930—BRES. Icon. Myc. XVI, pl. 760, 1930—HEIM, Inocybe, 315, f. 187, pl. 30, f. 1–2, 1931.

Agaricus devulgatus BRITZ. Derm. et Melanosp. 149, pl. 232, f. 140, 1883.

Inocybe devulgata SACC. Syll. Fung. V, 782, 1887.

Astrosporina praetervisa SCHROET. Pilze Schles. I, 576, 1889—REA, Brit. Basid. 209, 1922.

Solitary. Pileus 2–6 cm. broad, conico-campanulate, then expanded, umbonate or gibbous; surface slightly viscid when wet, yellowish-umber (clay or tawny-olive) at the disc, yellow-ocher on the margin, fibrillose, center glabrous, margin longitudinally virgate and often splitting; context white, odour not agreeable, taste none; lamellae attenuated-adnexed or almost free, white, then grayish to dirty cinnamon, subcrowded or subdistant, white-fimbriate on edge; stipe 4–8 cm. long, 4–8 mm. thick, equal, subbulbous at the base, whitish, then pale straw color, silky, apex white pruinose, solid; spores umber in mass, ellipsoidal, angulate, 10–12 × 7.5–8 μ; cystidia present, ventricose-fusiform, crystalate on the apex, hyaline.

Hab. on the ground in coniferous woods. Autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Asetake-modoki* (n. n.).

6. *Inocybe plumosa* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 179, 1872; Ench. Fung. 94, 1886—GILL. Hymen. Fr. 515, 1874—SACC. Syll. Fung. V, 763, 1887—KONR. et MAUBL. Icon. Sel. Fung. pl. 103, 1924.

Agaricus (*Inocybe*) *plumosus* FR. Syst. Myc. I, 256, 1821; Hymen. Eur. 228, 1874—WINT. Die Pilze, I, 694, 1884.

Agaricus (*Hebeloma*) *plumosus* FR. Epicr. Myc. 172, 1838—BERK. Outl. Brit. Fung. 153, 1860—CKE. Handb. Brit. Fung. I, 114, 1871.

Inocybe carpta BRES. Fung. Trid. I, 50, pl. 54, 1884; Icon. Myc. XVI, pl. 756, 1930—RICKEN, Blätterp. 102, pl. 29, f. 2, 1915—SACC. Fl. Ital. Crypt., Hymen. 723, 1916.

Astrosporina plumosa REA, Brit. Basid. 214, 1922.

?*Inocybe Rickeni* HEIM, Inocybe, 346, f. 200, pl. 32, f. 1–2, 1931.

Gregarious or solitary. Pileus 3–5 cm. broad, campanulate-convex, then umbonate; surface fuliginous-brown, darker at the disc, dry, non-hygrophanous, fibrillose, squamulose with recurved scales especially at the darker disc, not rimose; context pallid or whitish, concolorous under the pellicle of the pileus and stipe, taste none, odour earthy; lamellae sinuato-adnate, whitish, then cinnamon-ferruginous, crowded, ventricose; stipe 3–6 cm. long, 4–8 mm. thick, subequal, concolorous or paler, fibrillose or slightly fibrillose-squamulose, glabrous or slightly pruinose at the apex, stuffed then hollow; spores ferruginous in mass, ellipsoidal, angulate, nodulate-verrucose or trapezium-shaped, $8–12 \times 5–6\,\mu$; cystidia ventricose, fusiform, hyaline, yellowish-crystalate at the apex.

Hab. on the ground in coniferous woods or under coniferous trees, usually in alpine or subalpine regions. Late summer to autumn. Ishikari (Mt. Taisetsu).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Kuro-nise-tomayatake* (n. n.).

The present fungus has been somewhat puzzling as to its real identification. The writer depends mainly upon KONRAD and MAUBLANC's opinion.

Hebeloma (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 128, 1872.

Agaricus § *Hebeloma* FR. Syst. Myc. I, 249, 1821.
Roumegueria KARST. Hattsv. I, xxiv, 1879.
Hylophila § *Hebeloma* QUÉL. Ench. Fung. 98, 1886.
Derminus § *Hebeloma* SCHROET. Pilze Schles. I, 583, 1889.
Hebelomatis EARLE, Bull. N. Y. Bot. Gard. V, 430, 1909.
Picromyces EARLE, Ibid. V, 438, 1909.

Fructification with or without a fugacious viscid or dry veil. Pileus fleshy, regular, confluent and homogeneous with fleshy stipe. Stipe central, fibrous-fleshy. Lamellae sinuate, sinuato-adnate or adnexed. Spores ochraceous, ferruginous or fuscous in mass.

Type species: *Agaricus mesophaeus* PERS. ex FR.

Key to the sections and species in Hokkaido.

I. Fructification furnished with a cortina from the manifest veil, by which the pileus is often superficially silky around the margin........ Sect. Indusiata.
   A. Pileus hazel color on the disc, margin paler and with a yellow, silky-fibrous cortina or veil; stipe yellow and floccoso-squamulose... *H. Tomoeae* (1).
   B. Pileus carob-brown or pecan-brown on the center, margin cinnamon with a buff colored fugacious, fibrous squamules; stipe whitish with brownish fibrils.. *H. mesophaeum* (2).
   C. Pileus small (1.5–3 cm. broad), ochraceous-tawny, margin paler and with a white fugacious veil; stipe yellowish......... *H. fimicolum* (3).

II. Pileus glabrous, at first with no cortina.................. Sect. Denudata.
   A. *Pileus pale-tan color, disc brick-red, odour of radish; cystidia none....* .... *H. fastibile* (4).
   B. Pileus pale-ochraceous-tan, disc sometimes fuscous, odour none; cystidia none.. *H. longicaudum* (5).
   C. Pileus cinnamon; odour subfarinaceous; cystidia lanceolate........... .... *H. helvolescens* (6).
   D. Pileus nearly honey-yellow, odour subfarinaceous; cystidia subfusiform. .... *H. humosum* (7).

Sect. Indusiata FR.

Hymen. Eur. 237, 1874.

Fructification furnished with a cortina from the manifest veil, by which the pileus is often superficially silky around the margin.

1. *Hebeloma Tomoeae* IMAI, sp. nov.

Caespitosum vel gregarium. Pileo 3–5 cm. lato, conico-convexo, dein plano, subumbonato, obtuso, glutinoso, levi, glabro, "Hazel-color", margine pallidiore et luteo-fibrilloso; carne lutea, sapore miti; lamellis attenuato-adnexis vel attenuato-subliberis, confertis, lanceolatis, e pallidi subferrugineis; stipite 3–6 cm. longo, 5–10 mm. crasso, basi subbulboso, "citron-yellow" vel "primrose-yellow", floccoso-squamuloso, apice luteo et furfuraceo, basi fulvescente, farcto-cavo; cortina "citron-yellow", primo submembranacea, fugaci; sporis in cumulo fulvis, ellipsoideis, levibus, 6.5–10 × 4.5–6 μ; cystidiis fusiformibus, ventricosis, hyalinis vel flavidulis, 30–60 × 10–15 μ.

Hab. on the humus ground or decayed wood under trees, in gardens or roadsides. Summer to autumn. Ishikari (Sapporo).

Distr. Endemic.

Jap. name. *Tomoe-take* (n. n.).

The present fungus somewhat resembles *H. testaceum* (BATSCH ex FR.) QUÉL. from which it is easily distinguished by the more viscid pileus and yellow stipe as well as by the presence of cystidia.

The specific name is derived from the name of Miss TOMOE KAWAMURA who first discovered the fungus in her home garden.

2. *Hebeloma mesophaeum* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 128, 1872 -GILL. Hymen. Fr. 524, 1874—SACC. Syll. Fung. V, 795, 1887; Fl. Ital. Crypt., ymen. 700, 1916—MASS. Brit. Fung. Fl. II, 174, 1893—W. G. SM. Brit. Basid. 14, 1908—RICKEN, Blätterp. 115, pl. 32, f. 3, 1915—MURRILL, North Amer. Fl. , 220, 1917—KAUFFM. Agar. Mich. 473, 1918—REA, Brit. Basid. 256, 1922—BRES. on. Myc. XVI, pl. 712, 1930.

Agaricus fastibilis var. *mesophaeus* PERS. Myc. Eur. III, 173, 1828.

Agaricus (*Hebeloma*) *mesophaeus* FR. Epicr. Myc. 179, 1838; Hymen. Eur. 0, 1874—BERK. et BR. Ann. Mag. Nat. Hist. 2 ser. VII, 374, 1861—CKE. Handb. ·it. Fung. I, 112, 1871; Ill. Brit. Fung. pl. 412, 1886; Handb. Austr. Fung. 48, 92—WINT. Die Pilze, I, 685, 1884.

Inocybe mesophaea KARST. Hattsv. I, 470, 1879.

Hylophila (*Hebeloma*) *mesophaea* QUÉL. Ench. Fung. 99, 1886.

Hylophila versipellis var. *mesophaea* QUÉL. Fl. Myc. Fr. 95, 1888.

Hebeloma versipelle subsp. *mesophaeum* KONR. et MAUBL. Icon. Sel. Fung. . 78, f. 1, 1929.

Gregarious, caespitose in small groups, edible. Pileus 2–5 cm. broad, subconical at first, then expanded to umbonate or nearly plane; surface at first carob-brown with buff to cinnamon colored subfibrous margin, then slightly paler and finally orange-cinnamon to pecan-brown at the center, margin incurved at first and with buff colored fugacious fibrous squamules which disappear when old; context whitish, but brownish lower part of the stipe, odour faint and somewhat unpleasant, taste slightly bitter; lamellae subadnate with a decurrent tooth or sinuate-adnate, grayish or brownish at first, then clay-ferruginous, crowded, thin; stipe 4–8 cm. long, 4–7 mm. thick, equal, whitish and pruinose above, brownish fibrillose below, stuffed then nearly hollow; cortina whitish, at first fibrous-submembranous, fugacious; spores pale ferruginous in mass, ellipsoidal, faintly rough, 8–10 × 5–6 μ.

Hab. on the ground in woods, especially coniferous woods. Autumn. Ishikari (district near Sapporo), Kitami (Oketo forest).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America, Australia.

Jap. name. *Wakafusatake* (n. n.).

3. *Hebeloma fimicolum* IMAI, sp. nov.

Subcaespitosum vel gregarium. Pileo 1.5–3 cm. lato, hemisphaerico vel convexo, dein subplano, viscidulo, glabro, "ochraceous-tawny", margine pallidiore et glabro vel leviter albo-sericeo; carne albida vel flavidula, tenui, odore subfarinaceo, sapore nullo; lamellis sinuatis, confertis, ventricosis, e albido cinnamomeis, acie fimbriatis; stipite 4–6 cm. longo, 4–5 mm. crasso, subaequali, pallidiore, fibrilloso, cavo; velo albo, fugaci; sporis in cumulo fulvo-ferrugineis, late ellipsoideis, 12.5–16.5 × 8–10 μ, laevibus; cystidiis fusiformibus, hyalinis.

Hab. on horse dung under trees. Summer. Ishikari (Sapporo).

Distr. Endemic.

Jap. name. *Baba-wakafusatake* (n. n.).

The present fungus is somewhat allied to *H. gregarium* PK. from which it is distinguishable by the larger spores and the presence of cystidia.

Sect. Denudata FR.

Hymen. Eur. 240, 1874.

Pileus glabrous, no cortina at first.

4. *Hebeloma fastibile* (PERS. ex FR.) IMAI, comb. nov. (nec FR. in 1838, nec QUÉL. non Auct. plur.)

Agaricus crustuliniformis BULL. Champ. Fr. pl. 308, 546, 1786 (teste FR.).

Agaricus fastibilis PERS. Syn. Fung. 326, 1801 (teste FR.).

Agaricus (Hebeloma) fastibilis FR. Syst. Myc. I, 249, 1821.

Agaricus (Hebeloma) crustuliniformis FR. Epicr. Myc. 180, 1838; Hymen. Eur. 241, 1874—BERK. Outl. Brit. Fung. 157, pl. 9, f. 1, 1860—CKE. Handb. Brit. Fung. I, 112, 1871; Ill. Brit. Fung. pl. 414, 507, 1886—WINT. Die Pilze, I, 685, 1884.

Hebeloma crustuliniforme QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 128, 1872—GILL. Hymen. Fr. 525, cum icone, 1874—KARST. Hattsv. I, 471, 1879—SACC. Syll. Fung. V, 799, 1887; Fl. Ital. Crypt., Hymen. 692, 1916—MASS. Brit. Fung. Fl. II, 176, 1893—W. G. SM. Brit. Basid. 145, 1908—ROLLAND, Atlas Champ. 66, f. 152, 1910—RICKEN, Blätterp. 119, pl. 32, f. 2, 1915—MURRILL, North Amer. Fl. X, 223, 1917—KAUFFM. Agar. Mich. 476, pl. 97, 1918—REA, Brit. Basid. 257, 1922—BRES. Icon. Myc. XV, pl. 714, 1930.

Hylophila (Hebeloma) crustuliniformis QUÉL. Ench. Fung. 99, 1886.

Derminus (Hebeloma) crustuliniformis SCHROET. Pilze Schles. I, 583, 1889.

Gregarious or solitary, edible. Pileus 3–8.5 cm. broad, convex, then expanded to plane, obtuse or slightly gibbous; surface glabrous, viscid when young and fresh, pale-tan (pinkish-buff, apricot-buff or warm-buff), darker (ferruginous or pecan-brown) at the center, zoneless; context white, odour of radish, taste not unagreeable, thick, rather firm; lamellae deeply sinuate, close, whitish, then clay color or tawny-olive, spotted by the mass of spores when dry, distilling watery drops in wet weather or when young, edge wavy and white crenulate; stipe 4–10 cm. long, 5–15 mm. thick, equal, slightly bulbous at the base, white or whitish, white-mealy or squamulose at the apex, glabrous or slightly adpressed-fibrillose below, solid or stuffed; spores pale brown (cinnamon) in mass, ellipsoidal with acute ends, subamygdaliform, slightly granuloso-asperulate or nearly smooth, $10–13.5 \times 6–7.5\ \mu$; cystidia none; sterile cells on edge of lamellae cylindrical-clavate, hyaline, often with granular contents.

Hab. on the ground in woods, especially coniferous woods. Autumn. Ishikari (Nopporo, district neighbouring to Sapporo).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America.

Jap. name. *Ô-wakafusatake* (n. n.).

5. *Hebeloma longicaudum* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 345, 1873—GILL. Hymen. Fr. 526, cum icone, 1874—KARST. Hattsv. I, 472, 1879—SACC. Syll. Fung. V, 800, 1887; Fl. Ital. Crypt., Hymen. 694, 1916—MASS. Brit. Fung. Fl. II, 176, 1893—W. G. SM. Brit. Basid. 146, 1908—RICKEN, Blätterp. 119, pl. 33, f. 2, 1915—KAUFFM. Agar. Mich. 478, 1918—REA, Brit. Bsid. 258, 1922.

Agaricus longicaudus PERS. Syn. Fung. 332, 1801.

Agaricus (Myxacium) longicaudus FR. Syst. Myc. I, 248, 1821.

Agaricus (Hebeloma) longicaudus FR. Epicr. Myc. 181, 1838; Hymen. Eur. 241, 1874—RABENH. Deut. Krypt. Fl. I, 480, 1844—BERK. Outl. Brit. Fung. 157, pl. 9, f. 2, 1860—CKE. Handb. Brit. Fung. I, 113, 1871;—Ill. Brit. Fung. pl. 415, 1886—WINT. Die Pilze, I, 684, 1884.

Hylophila (Hebeloma) crustuliniformis var. *longicauda* QUÉL. Ench. Fung. 99, 1886.

Solitary or gregarious. Pileus 3–6 cm. broad, convex, then expanded, subumbonate, at length repand; surface smooth, glabrous, viscid when wet, pale ochraceous-tan, becoming whitish, margin whitish, pruinose; context white, soft, watery, thin at the margin, odour and taste almost none; lamellae arcuate-adnate, then emarginate, whitish, then pale clay color, at length cinnamon, crowded, edge minutely fimbriate; stipe 5–10 cm. long, 5–10 mm. thick, equal or thickened at the base, white, at length becoming tawny at the base, obsoletely fibrillose or fibrilloso-striate, mealy at the apex or throughout, fragile, stuffed then subhollow; spores tawny-ochraceous in mass, oblong-ellipsoidal, inequilateral narrow at the ends, verruculose, 10–12.5 × 5–7.5 μ; cystidia none; sterile cells on edge of lamellae long, filamentous-clavate, numerous.

Hab. on the ground in woods, especially coniferous woods. Autumn. Kushiro (Mt. Meakan).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Nagae-no-wakafusatake* (n. n.).

6. *Hebeloma helvolescens* IMAI, sp. nov.

Caespitosum. Pileo 4–8 cm. lato, conico-convexo, dein umbonato, glabro, non viscido, cinnamomeo, margine pallidiore; carne roseola,

odore subfarinaceo, sapore acri; lamellis emarginatis vel adnexis, confertis, primo "vinaceous-buff", dein fulvis; stipite 5–8 cm. longo, 8–16 mm. crasso, aequali vel attenuato, albo, obsolete fibrilloso, apice furfuraceo, cavo; sporis in cumulo fulvo-ferrugineis, ellipsoideis, laevibus, 8–10 × 4–5 μ; cystidiis lanceolatis vel subcylindrico-clavatis, saepe cristallatis, subhyalinis, 50–72.5 × 10–14 μ.

Hab. on the ground around the tree trunks in open woods. Summer. Ishikari (Sapporo).

Distr. Endemic.

Jap. name. *Ko-wakafusatake* (n. n.).

The present fungus somewhat resembles *H. fastibile* and its allies, but it is easily distinguished by the dry pileus and the presence of cystidia.

7. *Hebeloma humosum* IMAI, sp. nov.

Gregarium vel subcaespitosum. Pileo 3–7 cm. lato, hemisphaerico vel gibboso, dein subplano, laevi, submelleo, raro hygrophano, margine nudo; carne albida, sapore subacri, odore subfarinaceo; lamellis sinuatis vel emarginatis, confertis, primo griseis, dein cinnamomeis, acie albo-fimbriatis; stipite 2.5–6 cm. longo, 3–10 mm. crasso, aequali, basi incrassato, albido vel subconcolori, fibrilloso, apice subfurfuraceo, cavo; velo nullo; sporis in cumulo cinnamomeis, ellipsoideis, 10–11.5 × 7–8 μ, asperulis; cystidiis subfusoideo-ventricosis.

Hab. on badly decayed wood or on humus in gardens. Summer. Ishikari (Sapporo).

Distr. endemic.

Jap. name. *Ki-wakafusatake* (n. n.).

Gymnopilus KARST.

Hattsv. I, xxi, 1879.

Agaricus § *Flammula* FR. Syst. Myc. I, 250, 1821.

Flammula (non DC.) QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 129, 1872.

Gymnocybe KARST. Hattsv. I, xxii, 1879.

Derminus § *Flammulina* SCHROET. Pilze Schles. I, 582, 1889.

Ryssospora FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 361, 1889.

Visculus EARLE, Bull. N. Y. Bot. Gard. V, 437, 1909.

Fructification with or without a fugacious, viscid or dry veil. Pileus fleshy, regular, confluent and homogeneous with fleshy stipe. Stipe central, fibrous-fleshy. Lamellae decurrent or adnate with a decurrent tooth. Spores ochraceous, ferruginous or fuscous in mass.

Type species: *Agaricus liquiritiae* PERS. ex FR.

Key to the sections and species in Hokkaido.

I. Pileus covered with a continuous, somewhat separable, smooth, viscid pellicle; cortina manifest fibrillose; spores ferruginous, not tawny....... .... Sect. Lubrici.
- A. Pileus brick-red.................................... *G. lubrica*(1).
- B. Pileus whitish or buff, besprinkled with white, superficial, fugacious squamules... *G. lenta*(2).
- C. Pileus yellow, glabrous............................*G. spumosa*(3).

II. Pellicle of the pileus continuous, not distinct, non separable, smooth (here and there with a superficial covering), moist or a little viscid in wet weather; cortina manifest, appendiculate; spores not tawny, non-ochraceous.. Sect. Udi.
- A. Pileus scarlet-saffron color..................... *G. astragalina*(4).

III. Pileus scarcely pelliculose, flesh scissile, or torn above into scales, not viscid, at first somewhat hoary; veil fibrillosely adpressed to the stipe, not furnished with an appendiculate cortina, almost none or forming an annular zone on the stipe; lamellae light yellow or yellow, then tawny; spores ochraceous or tawny in mass............................Sect. Sapinei.
- A. Pileus yellowish tawny to golden yellow, paler at the margin; spores smooth.. *G. penetrans*(5).
- B. Pileus bay-brown or orange-tawny; spores verruculose or asperulate.. .... *G. liquiritiae*(6).

Sect. Lubrici FR.

Epicr. Myc. 184, 1838.

Pileus covered with a continuous, somewhat separable, smooth viscid pellicle; cortina manifest fibrillose; spores ferruginous, not tawny.

1. *Gymnopilus lubricus* (FR.) IMAI, comb. nov.

Agaricus (*Flammula*) *lubricus* FR. Syst. Myc. I, 252, 1821; Epicr. Myc. 185, 1838; Hymen. Eur. 246, 1874—RABENH. Deut. Krypt. Fl. I, 479, 1844—WINT. Die Pilze, I, 682, 1884.

Flammula lubrica QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 251, 1872—GILL. Hymen. Fr. 534, 1874—KARST. Hattsv. I, 402, 1879—SACC. Syll. Fung. V, 815, 1887; Fl. Ital. Crypt., Hymen. 739, 1916—MASS. Brit. Fung. Fl. II, 131, 1893—W. G. SM. Brit. Basid. 149, 1908—RICKEN, Blätterp. 203, pl. 57, f. 4, 1915—KAUFFM. Agar. Mich. 486, 1918—REA, Brit. Basid. 315, 1922—BRES. Icon. Myc. XVI, pl. 770, 1930—IMAI, Bot. Mag. (Tokyo), XLVII, 386, 1933.

Dryophila (Flammula) lubrica QUÉL. Ench. Fung. 70, 1886.

Naucoria (Flammula) lubrica SCHROET. Pilze Schles. I, 606, 1889.

Gregarious, sometimes caespitose in small group, edible. Pileus 4–10 cm. broad, convex, then expanded, obtuse or umbonate, sometimes depressed and repand; surface brick-red or bright cinnamon, sometimes pallid with tawny disc, viscid, smooth, sometimes spotted with glued down scales, margin paler and sometimes striate; context white, thick at the disc, tough, taste mild, odour rather strong; lamellae adnate, subdecurrent or subsinuate, pallid, then clay color, crowded; stipe 5–10 cm. long, 5–10 mm. thick, equal or slightly attenuated upward, subbulbous at the base, whitish, at length becoming fuscous, dry, laxly fibrillose, pubescent at the base; spores pale rusty-brown in mass, ellipsoidal, smooth, 5–6 × 3–3.5 μ; cystidia lanceolate-fusiform, abundant.

Hab. on or around the tree trunks in woods. Autumn. Ishikari (Nopporo, Jôzankei).

Distr. Japan (Hokkaido), Siberia, Europe, North America.

Jap. name. *Cha-name-tsumutake* (IMAI).

2. *Gymnopilus lentus* (PERS. ex FR.) MURRILL

North Amer. Fl. X, 204, 1917.

Agaricus lentus PERS. Syn. Fung. 287, 1801 (teste FR.).

Agaricus (Flammula) lentus FR. Syst. Myc. I, 253, 1821; Epicr. Myc. 184, 1838; Hymen. Eur. 246, 1874—BERK. in SMITH, Engl. Fl. V, (2), 95, 1836; Outl. Brit. Fung. 158, 1860—RABENH. Deut. Krypt. Fl. I, 479, 1844—CKE. Handb. Brit. Fung. I, 121, 1871; Ill. Brit. Fung. pl. 439–440, 1886—WINT. Die Pilze, I, 682, 1884.

Flammula lenta GILL. Hymen. Fr. 533, cum icone, 1874—KARST. Hattsv. I, 401, 1879—SACC. Syll. Fung. V, 815, 1887; Fl. Ital. Crypt., Hymen. 739, 1916—MASS. Brit. Fung. Fl. II, 130, 1893—W. G. SM. Brit. Basid. 149, 1908—RICKEN, Blätterp. 202, pl. 57, f. 3, 1915—KAUFFM. Agar. Mich. 487, 1918—LANGE, Agar. Denm. VII, 11, 1928—BRES. Icon. Myc. XVI, pl. 769, 1930—IMAI, Bot. Mag. (Tokyo), XLVII, 386, 1933.

Dryophila (Flammula) lenta QUÉL. Ench. Fung. 70, 1886.
Naucoria (Flammula) lenta SCHROET. Pilze Schles. I, 606, 1889.
Flammula betulina PK. Bull. Torrey Bot. Club, XXXIV, 100, 1907 (teste MURRILL).
Hebeloma glutinosum REA, Brit. Basid. 254, 1922.

Gregarious or caespitose in small groups, edible. Pileus 3–8 cm. broad, convex, then plane, regular; surface viscid, whitish or buff, slightly darker at the center, besprinkled with white, superficial, fugacious squamules, especially on the margin; context whitish, becoming light yellow, thick at the disc, taste mild, odour not unpleasant; lamellae adnate or adnexed with a decurrent tooth or sinuate-adnate, crowded, broad, whitish, then light yellowish, at length clay-cinnamon, ventricose; stipe 4–8 cm. long, 5–10 mm. thick, equal, subbulbous at the base, whitish, becoming ferruginous downward, fibrillose, white squamulose, apex white mealy, base strigose, stuffed; veil manifest, fugacious; spores pale cinnamon in mass, ellipsoidal, smooth, 5–7 × 3.5–4 μ; cystidia abundant, lanceolate-fusiform.

Hab. on or about dead tree trunks. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Shiro-name-tsumutake* (IMAI).

3. *Gymnopilus spumosus* (FR.) MURRILL

Mycologia, IV, 254, 1911; North Amer. Fl. X, 198, 1917.

Agaricus (Flammula) spumosus FR. Syst. Myc. I, 252, 1821; Epicr. Myc. 185, 1838; Hymen. Eur. 247, 1874—CKE. Handb. Brit. Fung. I, 122, 1871.

Flammula spumosa KARST. Hattsv. I, 404, 1879—QUÉL. Champ. Jura Vosg. 12 Suppl., in Assoc. Fr. XII, 499, 1883—SACC. Syll. Fung. V, 817, 1887; Fl. Ital. Crypt., Hymen. 740, 1916—MASS. Brit. Fung. Fl. II, 132, 1893—W. G. SM. Brit. Basid. 150, 1908—RICKEN, Blätterp. 204, pl. 57, f. 5, 1915—KAUFFM. Agar. Mich. 489, 1918—REA, Brit. Basid. 316, 1922—KONR. & MAUBL. Icon. Sel. Fung. pl. 60, 1928—BRES. Icon. Myc. XVI, pl. 773, 1930.

Dryophila (Flammula) spumosa QUÉL. Ench. Fung. 70, 1886.

Caespitose or gregarious, edible. Pileus 3–7 cm. broad, convex, then plane, finally slightly depressed at the center; surface when young sulphur-yellow, martius-yellow or citron-yellow at the margin and warm-buff to ochraceous-buff on the disc, then becoming darker, very viscid when wet, pellicle separable, at first glabrous, when old

becomes brownish-squamulose caused by breaking up of pellicle into small pieces, margin incurved and with fugacious, yellowish-white, floccose-membranous veil, at length naked and slightly upturned; context yellowish, taste none, odour faint; lamellae adnate or adnate with a decurrent tooth, crowded, whitish or yellowish at first, then pale-brownish; stipe 4–8 cm. long, 5–10 mm. thick, equal or slightly enlarged at the base, whitish or yellowish, white-powdery at the apex, brownish below, fibrous, stuffed; spores pale ferruginous in mass, oblong or ellipsoidal, 6–8 × 3–4.5 μ, smooth; cystidia lanceolate-ventricose, hyaline.

Hab. on the ground, around or on decaying tree trunks. Autumn. Ishikari (Nopporo, district neighbouring to Sapporo).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America.

Jap. name. *Ki-nametsumutake* (n. n.).

Sect. Udi FR.

Epicr. Myc. 186, 1838.

Pellicle of the pileus continuous, not distinct, non-separable, smooth (here and there with a superficial covering), moist or a little viscid in wet weather; cortina manifest, appendiculate; spores not tawny, nor ochraceous.

4. ***Gymnopilus astragalinus*** (FR.) IMAI, comb. nov.

Agaricus (Flammula) astragalinus FR. Syst. Myc. I, 251, 1821; Epicr. Myc. 186, 1838; Hymen. Eur. 248, 1874.

Agaricus Neesii BARLA, Champ. Nice, 46, pl. 23, 1859.

Flammula astragalina QUÉL. Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 347, 1873—GILL. Hymen. Fr. 537, 1874—KARST. Hattsv. I, 405, 1879—SACC. Syll. Fung. V, 819, 1887; Fl. Ital. Crypt., Hymen. 746, 1916—MASS. Brit. Fung. Fl. II, 135, 1893—W. G. SM. Brit. Basid. 151, 1908 —RICKEN, Blätterp. 206, 1915—REA, Brit. Basid. 318, 1922—KONR. & MAUBL. Icon. Sel. Fung. pl. 62, 1926—LANGE, Agar. Denm. VII, 12, 1928—BRES. Icon. Myc. XVI, pl. 776, 1930.

Dryophila (Flammula) astragalina QUÉL. Ench. Fung. 71, 1886.

Subcaespitose or gregarious, rarely solitary. Pileus 3–8 cm. broad, convex, then expanded, obtuse; surface scarlet-saffron, paler at the circumference, somewhat moist when wet, glabrous but at first

superficially silky round the margin and with the very thin, adpressed, subappendiculate, whitish veil; context firm, rather thick, concolorous, becoming black when wounded or bruised, taste bitter; lamellae adnate, crowded, yellowish at the edge, concolorous with the pileus at the base, edge obtuse and flocculose when young; stipe 5–10 cm. long, 4–8 mm. thick, equal or attenuated at the base, flexuous, yellowish or paler, floccosely fibrillose, at length subglabrous, hollow; cortina fugacious, white appendiculate; spores pale ferruginous in mass, ellipsoidal, smooth, 6–7.5 × 3–4.5 μ.

Hab. on the trunks of coniferous trees. Autumn. Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Europe.

Jap. name. *Aka-tsumutake* (n. n.).

Sect. Sapinei FR.

Epicr. Myc. 188, 1838.

Pileus scarcely pelliculose, flesh scissile, or torn above into scales, not viscid, at first somewhat hoary; veil fibrillosely adpressed to the stipe, not furnished with an appendiculate cortina, almost none or forming an annular zone on the stipe; lamellae light yellow or yellow, then tawny; spores ochraceous or tawny in mass.

5. *Gymnopilus penetrans* (FR.) MURRILL

Mycologia, IV, 254, 1912; North Amer. Fl. X, 203, 1917.

Agaricus penetrans FR. Obs. Myc. I, 23, 1815.

Agaricus (*Dermocybe*) *sapineus* FR. Syst. Myc. I, 239, 1821, p. p.

Agaricus (*Flammula*) *penetrans*, FR. Epicr. Myc. 189, 1838; Hymen. Eur. 250, 1874—WINT. Die Pilze, I, 680, 1884—CKE. Handb. Austr. Fung. 52, 1892.

Flammula penetrans QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 252, 1872—GILL. Hymen. Fr. 532, 1874—KARST. Hattsv. I, 409, 1879—SACC. Syll. Fung. V, 823, 1887; Fl. Ital. Crypt., Hymen. 744, 1916—RICKEN, Blätterp. 207, 1915—REA, Brit. Basid. 321, 1922—LANGE, Agar. Denm. VII, 12, 1928—BRES. Icon. Myc. XVI, pl. 780, 1930.

Dryophila (*Flammula*) *penetrans* QUÉL. Ench. Fung. 71, 1886.

Gregarious or sometimes caespitose. Pileus 3–7 cm. broad, conical or convex, then plane, obtuse, often irregular; surface dry, yellowish-tawny, golden-yellow, becoming paler, smooth, hoary under a lens when young; context whitish, thick at the disc, taste bitter,

odour not strong; lamellae adnate or emarginate, whitish, then pale yellow, spotted tawny when old or ferruginous to fulvous colored, crowded; stipe 4–8 cm. long, 3–6 mm. thick, equal or slightly attenuated upward, silky, whitish-fibrillose, streaked with yellow or brown, often much darker below with age, base white villous or myceloid and often rooting, sometimes fusiform when growing on the ground; cortina white, floccose, at first submembranous, very fugacious; spores ochraceous in mass, ellipsoidal or ovoid, 7–9 × 3.5–5 μ, smooth.

Hab. on dead coniferous wood in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Siberia, Asia Minor, Europe, North America, Australia.

Jap. name. *Ki-tsumutake* (n. n.).

6. *Gymnopilus liquiritiae* (PERS. ex FR.) KARST.

Hattsv. I, 400, 1879.

Agaricus liquiritiae PERS. Syn. Fung. 306, 1801 (teste FR.).

Agaricus (Flammula) liquiritiae FR. Epicr. Myc. 190, 1838; Hymen. Eur. 251, 1874.

Flammula liquiritiae QUÉL. Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 347, 1873—SACC. Syll. Fung. V, 825, 1887; Fl. Ital. Crypt., Hymen. 744, 1916—MASS. Brit. Fung. Fl. II, 140, 1893—W. G. SM. Brit. Basid. 152, 1908—RICKEN, Blätterp. 208, pl. 57, f. 2, 1915—REA, Brit. Basid. 322, 1922—BRES. Icon. Myc. XVI, pl. 783, 1930.

Dryophila (Flammula) liquiritiae QUÉL. Ench. Fung. 71, 1886.

Subcaespitose or scattered. Pileus 2–5 cm. or more broad, convex, then expanded, subumbonate; surface glabrous, bay-brown or orange-tawny, then becoming paler, moist, margin at length striatulate; context yellow, taste slightly bitter, odour slight; lamellae obtusely adnate, sometimes rounded, crowded, golden-yellow, then cinnamon; stipe 4–6 cm. long, 3–6 mm. thick, unequal or attenuated upward, often curved, tawny, then ferruginous, fibrous, striate, thickened and villous at the base, hollow; cortina none; spores ochraceous in mass, ellipsoidal, 5–6 × 3–4 μ, verruculose or asperulate.

Hab. on decayed coniferous wood in woods. Autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido), Siberia, Asia Minor, Europe.

Jap. name. *Cha-tsumutake* (n. n.).

Tribe **Rhodoteae** IMAI, trib. nov.

Fructificatio sine velo. Stipes excentricus. Lamellae sinuatae vel adnexae. Sporae in cumulo subochraceae vel dilute roseae.

Rhodotus R. MAIRE

Bull. Soc. Myc. Fr. XL, 308, 1924.

Pileus subgelatinous-fleshy, regular or subirregular, confluent and subhomogeneous with fibrous-fleshy stipe, without veil. Stipe excentric. Lamellae sinuate or adnexed, subgelatinous-fleshy. Spores subochraceous or pale rose color in mass.

Type species: *Agaricus subpalmatus* FR.

Rhodotus subpalmatus (FR.) IMAI, comb. nov.

Agaricus palmatus (non BULL.) SOW. Engl. Fung. I, pl. 62, 1797.

Agaricus palmatus (non BULL.) PERS. Syn. Fung. 474, 1801, p. p.

Agaricus (*Pleurotus*) *palmatus* (non BULL.) FR. Syst. Myc. I, 186, 1821, p. p.—BERK. in SMITH, Engl. Fl. V, (2), 73, 1836—RABENH. Deut. Krypt. Fl. I, 517, 1844.

Agaricus (*Pleurotus*) *subpalmatus* FR. Epicr. Myc. 131, 1838; Hymen. Eur. 168, 1874—BERK. Outl. Brit. Fung. 135, 1860—CKE. Handb. Brit. Fung. I, 46, 1871; Ill. Brit. Fung. pl. 255, 1883—WINT. Die Pilze, I, 738, 1884.

Pleurotus subpalmatus GILL. Hymen. Fr. 343, 1874—SACC. Syll. Fung. V, 343, 1887—MASS. Brit. Fung. Fl. II, 367, 1893—LLOYD, Myc. Writ. I, 51, f. 23–24, 1901—W. G. SM. Brit. Basid. 91, 1908—RICKEN, Blätterp. 449, 1915—KAUFFM. Agar. Mich. 662, 1918.

Clitocybe subpalmata KARST. Hattsv. I, 85, 1879.

Pleurotus palmatus QUÉL. Ench. Fung. 147, 1886—REA, Brit. Basid. 443, 1922.

Rhodotus palmatus R. MAIRE, Bull. Soc. Myc. Fr. XL, 308, 1924.

Caespitose or gregarious, rarely solitary, not poisonous. Pileus 1–6 cm. broad, convex then flattened; surface orange-pink to light salmon-orange, pellicle thick and gelatinous, exuding limpid rufescent drops, reticulate-corrugated, corrugated or smooth, powdery when dry, margin incurved; context white, then tinged with pale salmon color, very thick at the center, gelatinous-fleshy, taste none, odour strong; lamellae adnexed or often sinuate, usually paler than the pileus, rarely deeper colored, subgelatinous-fleshy, somewhat

tough, entire, broad, crowded; stipe 3.5–10 cm. long, 5–11 mm. thick, excentric, equal or attenuated up and downward, whitish, then pinkish, fibrillose-striate, pruinose at the upper part, curved ascending, solid or partly hollow; spores pale ochraceous-buff to ochraceous-tawny in mass, globose, about 6.5 μ, echinulate.

Hab. on rotten wood, especially of *Ulmus japonica* SARG. Late summer to autumn. Ishikari (Sapporo, Nopporo, Jôzankei), Kushiro, (Lake side of Akan).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Hoshi-anzu-take* (n. n.).

Tribe **Crepidoteae** IMAI, trib. nov.

Fructificatio sine velo. Stipes excentricus, lateralis vel nullus. Lamellae subdecurrentae. Sporae in cumulo ochraceae, ferrugineae vel fuscae.

Crepidotus (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 138, 1872.

Agaricus § *Crepidotus* FR. Syst. Myc. I, 272, 1821, p. p.
Phialocybe KARST. Hattsv. I, xxii, 1879.
Derminus § *Crepidotus* SCHROET. Pilze Schles. I, 578, 1889.

Pileus fleshy or submembranous, regular or irregular. Stipe excentric, lateral or none. Lamellae more or less decurrent or radiating from a central or lateral point. Spores ochraceous, ferruginous or fuscous in mass.

Type species: *Agaricus mollis* SCHAEFF. ex FR.

Key to the species in Hokkaido.

I. Spores ellipsoidal.
  A. Growing on logs, trunks, etc.
    1. Pileus white, whitish or grayish white.
      a. Pileus gelatinous or viscid when wet.
        i. Pileus 2–6 cm. broad .... *C. mollis* (1).
        ii. Pileus 1–2.5 cm. broad .... *C. haerens* (2).
      b. Pileus dry, 5–12 mm. broad .... *C. herbarum* (3).

2. Pileus ivory-yellow to chamois in color, dry, with minute brownish tomentum.................................... *C. viticolus* (4).

B. Growing on ground; pileus dry, whitish, minutely flucculose.......... .... *C. terrestris* (5).

II. Spores globose or subglobose.

A. Spores smooth.

1. Lamellae broad, rounded behind................. *C. malachius* (6).
2. Lamellae very narrow, decurrent............... *C. applanatus* (7).

B. Spores rough................................. *C. longistriatus* (8).

1. *Crepidotus mollis* (SCHAEFF. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 138, 1872; Ench. Fung. 108, 1886—GILL. Hymen. Fr. 557, 1874—KARST. Hattsv. I, 413, 1879—SACC. Syll. Fung. V, 877, 1887; Fl. Ital. Crypt., Hymen. 754, 1916—MASS. Brit. Fung. Fl. II, 117, 1893—W. G. SM. Brit. Basid. 167, 1908—RICKEN, Blätterp. 231, pl. 61, f. 1, 1915—MURRILL, North Amer. Fl. X, 151, 1917—KAUFFM. Agar. Mich. 519, 1918—REA, Brit. Basid. 454, 1922—BRES. Icon. Myc. XVI, pl. 789, 1930.

Agaricus mollis SCHAEFF. Fung. Bavar. IV, Ind. 49, pl. 213, 1774—SOW. Engl. Fung. I, pl. 98, 1797—PERS. Syn. Fung. 480, 1801 (teste FR.).

Agaricus (*Crepidotus*) *mollis* FR. Syst. Myc. I, 274, 1821; Epicr. Myc. 210, 1838; Hymen. Eur. 275, 1874—BERK. in SMITH, Engl. Fl. V, (2), 102, 1836; Outl. Brit. Fung. 164, pl. 9, f. 6, 1860—RABENH. Deut. Krypt. Fl. I, 471, 1844—CKE. Handb. Brit. Fung. I, 125, 1871; Ill. Brit. Fung. pl. 498, 1886; Handb. Austr. Fung. 58, 1892—WINT. Die Pilze, I, 661, 1884.

Derminus (*Crepidotus*) *mollis* SCHROET. Pilze Schles. I, 578, 1889.

Gregarious, imbricate, edible. Pileus 2–6 cm. broad, sessile or subsessile, obovate or reniform, convex, soon plane; surface glabrous, with a gelatinous pellicle which gives it a gelatinous feel, sometimes subviscid, pallid then ochraceous-white or cream-color, margin even or substriate, undulate and lobed when large; context subgelatinous especially under the pellicle, watery white, thin, odour and taste none; stipe when present short, strigose, up to 1.2 cm. long; lamellae decurrent to the base, radiating, narrow, sublinear, crowded, whitish, then watery cinnamon; spores ochraceous in mass, ellipsoidal or oblong, smooth, 8–10 × 5–6 μ.

Hab. on decaying logs, limbs or trunks, in woods. Autumn. Kitami (Oketo forest).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America, Australia.

Jap. name. *Cha-hiratake* (n. n.).

2. *Crepidotus haerens* (PK.) SACC.

Syll. Fung. V, 880, 1887—MURRILL, North Amer. Fl. X, 150, 1917—KAUFFM. Agar. Mich. 518, 1918.

Agaricus haerens PK. 35 Ann. Rep. N. Y. State Mus. 132, 1884.

Gregarious and imbricate. Pileus 1–2.5 cm. broad, sessile, convex, dimidiate or flabellate; surface glabrous or slightly squamulose, hygrophanous, watery-white or gray and viscid when wet, white or whitish when dry, margin striatulate when wet; lamellae moderately crowded, narrow, attenuated toward both ends, subcinereous, becoming ferruginous; spores ferruginous-brown in mass, ellipsoidal, 7.5–8.5 × 5 μ.

Hab. on rotten wood in woods. Summer. Ishikari (Nopporo).

Distr. Japan (Hokkaido), China, North America.

Jap. name. *Ko-chahiratake* (n. n.).

3. *Crepidotus herbarum* (PK.) SACC.

Syll. Fung. V, 888, 1887—MURRILL, North Amer. Fl. X, 149, 1917—KAUFFM. Agar. Mich. 519, 1918.

[MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 116, 1931]

Agaricus herbarum PK. Bull. Buffalo Soc. Nat. Sci. I, 53, 1873.

Gregarious and usually imbricate. Pileus 5–12 mm. broad, sessile, suborbicular, dimidiate; surface white, dry, covered with white downy villi or velveting, incurved on the margin when young, sometimes becoming reflexed; lamellae radiating from an excentric or lateral point, moderately crowded, white, then subferruginous; spores subferruginous in mass, broadly ellipsoidal, smooth, 6–7.5 × 3.75–4.5 μ.

Hab. on decaying wood, dead stems of herbs, etc., in woods. Summer. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), China, North America.

Jap. name. *Konakaburi-modoki* (MATSUURA).

4. *Crepidotus viticolus* IMAI, sp. nov.

Gregarius vel subcaespitosus, imbricatus. Pileo 1–3.5 cm. lato, subsessili, reniformi vel cuneiformi, basi albo-tomentoso, "ivory-yellow" vel "chamois", juvenile et margine pallidiori, sicco, minute

brunneo-tomentoso, margine non striato; carne alba, subcarnosa; lamellis adnatis vel determinatis, e albido fulvo-cinnamomeis, confertis; sporis in cumulo fulvis, late ellipsoideis, levibus, 7.5–9 × 5–6 μ.

Hab. on twigs of *Vitis Kaemperi* K. KOCH. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Ki-chahiratake* (n. n.).

The present fungus somewhat resembles *C. applanatus* in general appearance, but it is distinguished from the latter by the smaller, yellow pileus and broadly ellipsoidal spores.

5. *Crepidotus terrestris* IMAI, sp. nov.

Gregarius, imbricatus. Pileo 7–40 mm. lato, sessili, suborbiculari, reniformi, dimidiato, cuneiformi vel subcampanulato penduloque, albido, minute flocculoso, basi albo-villoso, margine undulato, non striato; carne tenui, albida; lamellis e albio avellaneis, subdistantibus vel subconfertis, latiusculis; sporis in cumulo subferrugineis, ellipsoideis, levibus, 7.5–10 × 5 μ.

Hab. on clay soil on hill sides in woods. Autumn. Ishikari (Nopporo, Mt. Kurodake).

Distr. Endemic.

Jap. name. *Tsuchi-chahiratake* (n. n.).

The present fungus resembles *C. epigaeus* (B. et C.) SACC. in its habitat on the ground. It is however distinguished from the latter by the larger white pileus.

6. *Crepidotus malachius* (B. et C.) SACC.

Syll. Fung. V, 883, 1887—MURRILL, North Amer. Fl. X, 151, 1917—KAUFFM. Agar. Mich. 523, 1918.

Agaricus malachius BERK. et CURT. Ann. Mag. Nat. Hist. 3 ser. IV, 291, 1859.

Gregarious and imbricate. Pileus 1.5–4.5 cm. broad, 1.5–3.5 cm. long, commonly plane, sessile or with a very short, inconspicuous, white, tomentose, lateral stipe; surface glabrous or slightly tomentose at the base, hygrophanous, watery-white or grayish-white, striatulate and avellaneous colored on the margin when wet; context white, taste and odour none; lamellae crowded, rounded behind or adnate

with a decurrent tooth, rather broad, whitish, becoming avellaneous; spores cinnamon in mass, globose, 6.5–7.5 μ.

Hab. on decayed or prostrate tree trunks. Summer. Ishikari (Nopporo).

Distr. Japan (Hokkaido), North America.

Jap. name. *Hiroha-chahiratake* (n. n.).

7. *Crepidotus applanatus* (PERS. ex FR.) KARST.

Hattsv. I, 414, 1879—QUÉL. Ench. Fung. 108, 1886—SACC. Syll. Fung. V, 878, 1887; Fl. Ital. Crypt., Hymen. 755, 1916—MASS. Brit. Fung. Fl. II, 117, 1893—W. G. SM. Brit. Basid. 168, 1908—RICKEN, Blätterp. 231, 1915—MURRILL, North Amer. Fl. X, 150, 1917—KAUFFM. Agar. Mich. 524, 1918—BRES. Icon. Myc. XVI, pl. 790, 1930.

Agaricus applanatus PERS. Obs. Myc. I, 8, 1796 (teste FR.).

Agaricus planus PERS. Syn. Fung. 480, 1801 (teste FR.).

Agaricus (Crepidotus) applanatus FR. Epicr. Myc. 210, 1838; Hymen. Eur. 275, 1874—RABENH. Deut. Krypt. Fl. I, 470, 1844—WINT. Die Pilze, I, 661, 1884.

Gregarious and imbricate. Pileus 1–5 cm. broad, variable in form, suborbicular, reniform, cuneiform or spathulate, convex, soon plane, often depressed behind, sessile or with a short, compressed, white tomentose base; surface glabrous, hygrophanous, watery-cinnamon when moist, whitish when dry, striatulate on the margin when moist; context white, watery, soft; lamellae decurrent but ending determinately behind, whitish, then watery-cinnamon, very narrow, crowded; spores subferruginous in mass, globose or subglobose, smooth, 5–6.5 μ.

Hab. on decayed wood, logs, stumps, etc. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Maru-mi-no-chahiratake* (n. n.).

8. *Crepidotus longistriatus* IMAI, sp. nov.

Gregarius, subimbricatus. Pileo 1–2 cm. lato, laterale breveque stipitato vel subsessili, convexo-plano, demum leviter depresso, margine undulato lobatoque, albido, glabro, longe striato; carne tenui, molli; lamellis decurrentibus, e albido cinnamomeis, confertis; stipite

brevissimo, albo-tomentoso; sporis in cumulo laete ochraceis, subglobosis, globosis vel subovatis, 6–8 μ, verruculosis.

Hab. on rotten wood in woods. Summer. Ishikari (Nopporo).

Dists. Endemic.

Jap. name. *Zarami-no-chahiratake* (n. n.).

Tribe **Paxilleae** P. HENN. emend. HEIM

Fungi Iberici, 67, 1834.

Paxillées FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 384, 1889, p. p.
Paxilleae P. HENN. in ENGLER & PR. Nat. Pflanzenfam. I, 1**, 202, 1897.
Paxillaceae KONR. et MAUBL. Icon. Sel. Fung. 27, 1924—SINGER, Ann. Myc. XXXIV, 326, 1936.

Fructification usually without veils. Pileus fleshy, regular, excentric, dimidiate or resupinate. Stipe central, excentric, lateral or none. Lamellae decurrent, soft, separable or almost not separable, often venoso-connected at the base or anastomosed behind. Spores ochraceous or ferruginous in mass.

Key to the genera.

1. Pileus incurved at the margin; lamellae easily separable from the pileus.... .... *Paxillus.*
2. Pileus not incurved at the margin; lamellae almost not separable from the pileus.......... *Phylloporus.*

Paxillus FR.

Genera Hymen. 8, 1836; Epicr. Myc. 315, 1838, p. p.

Agaricus § *Tapinia* FR. Syst. Myc. I, 269, 1821, p. p.
Paxillus § *Tapinia* FR. Epicr. Myc. 317, 1838.
Tapinia KARST. Hattsv. I, xxiii, 1879.

Pileus fleshy, regular, excentric, dimidiate or resupinate, confluent with fibrous-fleshy stipe. Stipe central, excentric, lateral or none. Lamellae decurrent, soft, mostly furcate and anastomosing next the stipe, easily separable from the pileus. Spores ochraceous or ferruginous in mass.

Type species: *Agaricus involutus* BATSCH ex FR.

Key to the subgenera and species in Hokkaido.

I. Pileus with stipe and mostly regular or excentric.... Subgen. Veripaxillus.
  1. Pileus regular, convex then depressed, clay or reddish-brown, margin at first involute and villose........................ *P. involutus* (1).

II. Pileus without distinct stipe, dimidiate or resupinate..... Subgen. Tapinia.
  1. Entirely dingy yellow, sessile and at first resupinate... *P. panuoides* (2).

Subgen. Veripaxillus Imai, nom. nov.

Pileus stipitatus, plerumque regularis vel excentricus.

1. *Paxillus involutus* [Batsch] Fr.

Epicr. Myc. 317, 1838; Hymen. Eur. 403, 1874—Berk. Outl. Brit. Fung. 195, pl. 12, f. 5, 1860—Kickx, Fl. Crypt. Flandr. II, 194, 1867—Cke. Handb. Brit. Fung. I, 194, 1871; Ill. Brit. Fung. pl. 875, 1888—Quél. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 183, 1872; Ench. Fung. 93, 1886—Gill. Hymen. Fr. 529, cum icone, 1874—Karst. Hattsv. I, 450, 1879—Wint. Die Pilze, I, 573, 1884—Sacc. Syll. Fung. V, 987, 1887—Schroet. Pilze Schles. I, 516, 1889—Mass. Brit. Fung. Fl. II, 9, 1893—Atkins. Mushrooms, ed. 2, 166, f. 159, 1903—W. G. Sm. Brit. Basid. 253, 1908—Rolland, Atlas Champ. 67, f. 153, 1910—Ricken, Blätterp. 96, pl. 28, f. 2, 1915—Murrill, North Amer. Fl. X, 147, 1917—Kauffm. Agar. Mich. 286, 1918—Rea, Brit. Basid. 551, 1922—Bres. Icon. Myc. XIV, pl. 677, 1930.

Agaricus lateralis Schaeff. Fung. Bavar. IV, Ind. 31, pl. 71–72, 1774 (teste Fr.).

Agaricus contiguus Bull. Champ. Fr. pl. 240, 576, f. 2, 1784—Sow. Engl. Fung. pl. 56, 1797 (teste Fr.).

Agaricus involutus Batsch, Elench. Cont. I, 39, pl. 13, f. 61, 1786—Pers. Syn. Fung. 448, 1801 (teste Fr.).

Agaricus (Tapinia) involutus Fr. Syst. Myc. I, 271, 1821.

Cortinaria involuta Sicard, Hist. Nat. Champ. 150, f. 206, 1884.

Paxillus lateralis Sacc. Fl. Ital. Crypt., Hymen. 669, 1916.

Gregarious or solitary, edible. Pileus 4–10 cm. broad, convex, then depressed in the center, at length subinfundibuliform, variable in color, i.e. grayish, clay color, dark brown or reddish brown, viscid when wet, shining when dry, margin involute, verruculose-striatulate, inconspicuously villose; context spongy-soft, yellowish, changing to brownish when bruised, taste and odour none; lamellae decurrent, pallid, then ferruginous, rarely reticulated on the stipe, but commonly united near the stipe; stipe 3–8 cm. long, 6–12 mm. thick, equal

or slightly attenuated downward, pallid with reddish tinge, then dingy yellow or cinnamon-brown, velvety, usually central, sometimes excentric, solid, stout, context brownish; spores cinnamon to clay color in mass, ellipsoidal, with a central gutta, 7.5–10.5 × 4.5–6 μ.

Hab. on the ground or on decayed wood under ground or rarely on the bark of living elder tree trunk. Late summer to autumn. Ishikari (Nopporo, Mt. Teine, Mt. Soranuma, Sapporo, Mt. Taisetsu), Tokachi (Lake side of Shikaribetsu), Kushiro (Lake side of Kutcharo, Mt. Meakan, Lake side of Akan), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Hida-ha-take* (n. n.).

Subgen. Tapinia (FR. emend. KARST.) IMAI, nom. nov.

Agaricus § *Tapinia* FR. Syst. Myc. I, 269, 1821, p. min. p.
Tapinia KARST. Hattsv. I, xxiii, 1879.

Pileus sine stipite manifesto, dimidiatus vel resupinatus.

2. *Paxillus panuoides* FR.

Epicr. Myc. 318, 1838; Hymen. Eur. 404, 1874—BERK. Outl. Brit. Fung. 196, pl. 12, f. 6, 1860—CKE. Handb. Brit. Fung. I, 195, 1871; Ill. Brit. Fung. pl. 878, 1888; Handb. Austr. Fung. 73, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul Montb. 2 sér. V, 183, 1872—WINT. Die Pilze, I, 571, 1884—SACC. Syll. Fung. V, 889, 1887—MASS. Brit. Fung. Fl. II, 11, 1893—ATKINS. Mushrooms, ed. 2, 170, f. 162–163, 1903—W. G. SM. Brit. Basid. 255, 1908—ROLLAND, Atlas Champ. 67, f. 155, 1910—RICKEN, Blätterp. 95, pl. 28, f. 3, 1915—KAUFFM. Agar. Mich. 288, 1918—REA, Brit. Basid. 553, 1922—BRES. Icon. Myc. XIV, pl. 681, 1930.

[LLOYD, Myc. Writ. V, Letter No. 63, p. 9, 1916—YASUDA, Bot. Mag. (Tokyo), XXX, (419), 1916—SHIRAI, List Jap. Fung. ed. 3, 243, 1927]

Agaricus acheruntius HUMB. Fl. Frib. 73, 1793 (teste SCHROET.).

Merulius lamellosus SOW. Engl. Fung. pl. 403, 1803 (teste FR.).

Agaricus panuoides FR. Obs. Myc. II, 227, 1818.

Agaricus (*Crepidotus*) *panuoides* FR. Syst. Myc. I, 273, 1821.

Rhymovis panuoides RABENH. Deut. Krypt. Fl. I, 453, 1844.

Paxillus rudis BERK. et CURT. Ann. Mag. Nat. Hist. 3 ser. IV, 296, 1859 (teste MURRILL).

Paxillus ligneus BERK. et CURT. Journ. Linn. Soc., Bot. IX, 423, 1867 (teste MURRILL).

Paxillus lamellirugus QUÉL. Ench. Fung. 93, 1886.

Paxillus acheruntius SCHROET. Pilze Schles. I, 515, 1889—SACC. Fl. Ital. Crypt., Hymen. 666, 1916.

[P. HENN. in ENGLERS Bot. Jahrb. XXXII, 40, 1902—MATSUM. Ind. Pl. Jap. I, 157, 1904—SHIRAI, List Jap. Fung. 61, 1905; ed. 2, 407, 1917; ed. 3, 243, 1927]

Tapinia panuoides KARST. Hattsv. I, 452, 1879.

Tapinia lamellosa MURRILL, North Amer. Fl. X, 146, 1917.

Imbricate. Pileus 2–6 cm. broad, 1.5–5 (–10) cm. long, sessile or subsessile, at first resupinate, soon conchate, dimidiate and obovate, at length broadly expanded, undulate-lobate; surface dingy yellow, ochraceous or cinnamon, pubescent or squamulose, becoming smooth and glabrous, somewhat rivulose, base tomentose, often colored with purple tint; context cream color, becoming whitish, soft, thin, odour none, taste slight; lamellae decurrent at the base, anastomosing behind, branched, crisped, crowded, narrow, yellow or orange; spores ochraceous in mass, subellipsoidal or subglobose, 4–6 × 3–4 μ, smooth.

Hab. on the rotten coniferous stumps and wood. Late summer to autumn. Ishikari (Sapporo, Nopporo, Mt. Kurodake), Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Australia.

Jap. name. *Ichô-take* (YASUDA).

Phylloporus QUÉL.

Fl. Myc. Fr. 409, 1888.

Pileus fleshy, regular, confluent with fibrous-fleshy stipe. Stipe central or nearly so. Lamellae decurrent, venoso-connected at the base, or poroso-anastomosed behind, concrete with the pileus. Spores ochraceous in mass.

Type species: *Agaricus Pelletieri* LÉV.

Phylloporus rhodoxanthus (SCHW.) BRES.

Fungi Trid. II, 95, 1900; Icon. Myc. XVI, pl. 768, 1930—MURRILL, North Amer. Fl. X, 193, 1917.

Agaricus rhodoxanthus SCHEW. Schr. Nat. Ges. Leipzig, I, 83, 1822 (teste BRES.).

Paxillus flavidus BERK. London Journ. Bot. VI, 315, 1847 (teste BRES.).

Agaricus (Flammula) Tammii FR. Monogr. Hymen. Suec. II, 301, 1863; Hymen. Eur. 244, 1874 (teste BRES.).

Agaricus Pelletieri LÉV. in CROUAN, Fl. Finist. 81, 1867 (teste BRES.).

Agaricus paradoxus KALCHBR. Icon. Hung. pl. 16, f. 1, 1873—FR. Hymen. Eur. 244, 1874 (teste BRES.).

Clitocybe Pelletieri GILL. Hymen. Fr. 170, cum icone, 1874—KAWAMURA, Ill. Jap. Fung. pl. 11, f. 3–4, 1914.

[SHIRAI, List Jap. Fung. ed. 2, 145, 1917; ed. 3, 86, 1927]

Paxillus paradoxus CKE. et QUÉL. Clavis Hymen. 131, 1878—QUÉL. Ench. Fung. 93, 1886—MASS. Brit. Fung. Fl. II, 8, 1893—W. G. SM. Brit. Basid. 253, 1908—REA, Brit. Basid. 551, 1922.

Gymnocybe Tammii KARST. Hattsv. I, 412, 1879.

Paxillus Tammii PAT. Tab. Anal. Fung. no. 354, 1885.

Flammula Tammii SACC. Syll. Fung. V, 810, 1887; Fl. Ital. Crypt., Hymen. 742, 1916.

Gomphidius rhodoxanthus SACC. Syll. Fung. V, 1139, 1887.

Phylloporus Pelletieri QUÉL. Fl. Myc. Fr. 409, 1888.

Paxillus rhodoxanthus RICKEN, Blätterp. 95, pl. 28, f. 1, 1915—KAUFFM. Agar. Mich. 285, 1918.

Phylloporus paradoxus LANGE, Agar. Denm. XI, 37, 1936.

Solitary or gregarious. Pileus 3–8 cm. broad, convex, then plane, depressed or obtuse, somewhat turbinate; surface densely velvety-tomentose, glabrescent, dry, often rimosely cracked, varying in color, yellowish, reddish, ferruginous or olivaceous, margin not striate, often lobed and sinuate; context thick at the disc, pale reddish, then yellow, taste and odour mild; lamellae decurrent, bright yellow, at length tinged brownish color, distant to subcrowded, sometimes forked, very intervenose, sometimes poroso-anastomosed toward stipe; stipe 3–8 cm. long, 5–10 mm. thick, equal or subventricose, somewhat rooted, yellow or reddish-yellow, adpressedly fibrillose, punctate with small, reddish-brown scales or dots, solid; spores ochraceous in mass, elongated-oblong or oblong-cylindrical, smooth, 10–13 × 3–5 μ; cystidia fusiform, yellowish.

Hab. on the ground in woods. Autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Kihida-take* (KAWAMURA).

Tribe Naucorieae IMAI, nom. nov.

Naucoriés FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 357, 1889, p. p.
Naucoriées KONR. et MAUBL. Icon. Sel. Fung. 28 & 185, 1924.

Fructificatio vulgo sine velo. Pileus carnosus vel submembranaceus, fragilis, cum stipite cartilagineo confluentus. Stipes centralis, cartilagineus vel subcartilagineus. Lamellae liberae, sinuatae, adnexae, adnatae vel decurrentae. Sporae in cumulo ochraceae, ferrugineae vel fulvae.

Key to the genera.

I. Lamellae adnate or sinuato-adnate.
  A. Pileus at first incurved on the margin or exceeding the lamellae...... .... *Naucoria.*
  B. Pileus straight and at first adpressed to the stipe........... *Gelerula.*
II. Lamellae free... *Pluteolus.*

Naucoria (FR.) QUÉL.

Champ. Jura Vosg. I, *in Mém. Soc. D'Emul. Montb.* 2 sér. V, 62 & 131, 1872.
Agaricus § *Naucoria* FR. Syst. Myc. I, 260, 1821.
Simocybe KARST. Hattsv. I, xxii, 1879.
Agrocybe FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 358, 1889.
Bulla EARLE, Bull. N. Y. Bot. Gard. V, 424, 1909.

Pileus fleshy, heterogenous from the cartilagious stipe, regular, margin at first incurved. Stipe central, cartilaginous. Lamellae adnate, sinuate-adnate or adnexed. Spores ochraceous, ferruginous or fuscous in mass.

Type species: *Agaricus melinoides* BULL. ex FR.

Key to the sections and species in Hokkaido.

I. Pileus smooth, veil none; spores ferruginous.............. Sect. Gymnotae.
  A. Lamellae nearly free or slightly adnexed.
    1. Pileus acutely conical, then umbonate, viscid, vinaceous-tawny or pinkish-cinnamon; stipe darker................ *N. Christinae* (1).
  B. Lamellae adnate.
    1. Pileus convex, then plane, viscid, wood-brown or fawn-color; stipe cinnamon.................................... *N. abstrusa* (2).

II. Pileus floccose or squamulose, veil manifest; spores ferruginous.......... .... Sect. Lepidotae.
  A. Pileus densely covered by small amber-brown colored scales or granules; stipe cinnamon........................ *N. conspersa* (3).

Sect. Gymnotae FR.

Epicr. Myc. 191, 1838.

Pileus glabrous, veil none. Spores ferruginous, not becoming fuscous.

1. *Naucoria Christinae* (FR.) SACC.

Syll. Fung. V, 829, 1887; Fl. Ital. Crypt., Hymen. 766, 1916—RICKEN, Blätterp. 215, 1915—MURRILL, North Amer. Fl. X, 173, 1917—BRES. Icon. Myc. XVI, pl. 793, 1930.

Agaricus (*Naucoria*) *Christinae* FR. Epicr. Myc. 192, 1838; Hymen. Eur. 254, 1874.

Gregarious. Pileus 1.5–3 cm. broad, acutely conical when young, then expanded to umbonate with a sharp umbo; surface subhygrophanous, vinaceous-tawny when moist, becoming pinkish-cinnamon when dry, viscid, smooth; context thin, yellowish or subconcolorous; lamellae nearly free or slightly adnexed, crowded, pallid, then pinkish-cinnamon or cinnamon; stipe 6–10 cm. long, 3–5 mm. thick, cylindrical, radicate at the base, glabrous, cartilaginous, very tough, vinaceous-brown to dark livid-brown or dark vinaceous-brown, paler (vinaceous-tawny) at the apex, fistulose; spores cinnamon in mass, amygdaliform, 8–10 × 5–6 μ, smooth.

Hab. on the ground among mosses in woods. Autumn. Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Name-nise-mukuetake* (n. n.).

2. *Naucoria abstrusa* (FR.) SACC.

Syll. Fung. V, 835, 1887—MASS. Brit. Fung. Fl. II, 156, 1893—W. G. SM. Brit. Basid. 156, 1908—RICKEN, Blätterp. 216, 1915—REA, Brit. Basid. 351, 1922.

Agaricus (*Naucoria*) *abstrusus* FR. Epicr. Myc. 194, 1838; Hymen. Eur. 257, 1874—CKE. Ill. Brit. Fung. pl. 456, 1886.

Simocybe abstrusa KARST. Hattsv. I, 421, 1879.

Gregarious or solitary. Pileus about 2 cm. broad, convex or slightly subumbonate, then plane; surface glabrous, smooth, viscid, nearly polished when dry, wood-brown or fawn color in dry weather but darker at the disc; context subconcolorous, becoming paler; lamellae adnate or adnexed, crowded, pinkish-buff to cinnamon; stipe 3–4 cm. long, 1.5–2 mm. thick, equal, cinnamon in dry weather, darker at the base, cartilaginous, naked, polished, hollow; spores cinnamon in mass, ellipsoidal, 8.5–11 × 4–5 μ; sterile cells on the edge of lamellae flask-shaped, pointed, 25–30 × 7.5–10 μ.

Hab. on the ground in woods. Summer. Iburi (Tomakomai).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Nise-mukuetake* (n. n.).

Sec. Lepidotae FR.

Epicr. Myc. 199, 1838.

Pileus floccose or squamulose, veil manifest. Spores ferruginous.

3. *Naucoria conspersa* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 133, 1872—GILL. Hymen. Fr. 543, 1874—KARST. Hattsv. I, 433, 1879—SACC. Syll. Fung. V, 854, 1887; Fl. Ital. Crypt., Hymen. 762, 1916—MASS. Brit. Fung. Fl. II, 167, 1893—W. G. SM. Brit. Basid. 160, 1908—REA, Brit. Basid. 359, 1922—BRES. Icon. Myc. XVI, pl. 800, f. 2, 1930.

Agaricus conspersus PERS. Icon. Descr. Fung. II, 50, pl. 12, f. 3, 1800; Syn. Fung. 318, 1801 (teste FR.).

Agaricus (Naucoria) conspersus FR. Syst. Myc. I, 260, 1821; Epicr. Myc. 201, 1838; Hymen. Eur. 264, 1874—RABENH. Deut. Krypt. Fl. I, 474, 1844—CKE. Handb. Brit. Fung. I, 130, 1871; Ill. Brit. Fung. pl. 512, f. A, 1886—WINT. Die Pilze, I, 671, 1884.

Hylophila (Naucoria) conspersa QUÉL. Ench. Fung. 103, 1886.

Solitary or gregarious. Pileus 1.5–2.5 cm. broad, subconical or convex, then subplane; surface dry, densely covered with small amber-brown colored scales or granules, scales longer on the disc, minute on the margin, margin not striate; context very thin, odour faintly mealy; lamellae ascending adnate, then emarginate-separating, ventricose, rather broad, attenuated to the margin of pileus, subcrowded, clay color to tawny-olive, edge white-crenulate; stipe 2.5–3 cm. long, 1.5–2 mm. thick, equal, nearly cinnamon-colored. fib-

rous, subshining, nearly pruinose above, stuffed or hollow; spores clay color in mass, yellowish under microscope, oblong or ellipsoidal, 6–8 × 3.5–4.5 μ; sterile cells on edge of lamellae long-pyriform, broadly clavate or subcapitate, hyaline.

Hab. on humid ground or on badly decayed wood under ground in woods. Summer. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Cha-mukuetake* (n. n.).

Galerula KARST.

Hattsv. I, xxiii, 1879.

Agaricus § *Galera* FR. Syst. Myc. I, 264, 1821.

Galera (non BLUME) QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 62 & 135, 1872.

Derminus § *Galera* SCHROET. Pilze Schles. I, 579, 1889.

Conocybe FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 357, 1889.

Galerella EARLE, Bull. N. Y. Bot. Gard. V, 422, 1909.

Galerina EARLE, Ibid. 423, 1909.

Pileus fleshy or submembranous, margin straight, at first adpressed to the stipe. Stipe central, cartilaginous. Lamellae adnate or adnexed. Spores cinnamon or ferruginous in mass.

Type species: *Agaricus ovalis* FR.

Key to the species in Hokkaido.

1. Pileus small (1–2 cm. broad); lamellae linear, narrow........ *G. tenera* (1).
2. Pileus large (2–3 cm. broad); lamellae broad, ventricose.................. .... *G. campanulata* (2).

1. *Galerula tenera* (SCHAEFF. ex FR.) MURRILL

North Amer. Fl. X, 166, 1917.

Agaricus tener SCHAEFF. Fung. Bavar. IV, Ind. 31, pl. 70, f. 6–8, 1774—SOW. Engl. Fung. I, pl. 33, 1797—PERS. Syn. Fung. 386, 1801 (teste FR.).

Agaricus (*Galera*) *tener* FR. Syst. Myc. I, 265, 1821; Epicr. Myc. 204, 1838; Hymen. Eur. 267, 1874—BERK. in SMITH, Engl. Fl. V, (2), 100, 1836; Outl. Brit. Fung. 162, 1860—RABENH. Deut. Krypt. Fl. I, 473, 1844—KICKX, Fl. Crypt. Flandr. II, 170, 1867—CKE. Handb. Brit. Fung. I, 133, 1871; Ill. Brit. Fung. pl. 461, 1886; Handb. Austr. Fung. 56, 1892—WINT. Die Pilze, I, 668, 1884.

Galera tenera QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb.

2 sér. V, 136, 1872; Ench. Fung. *106, 1886*—GILL. Hymen. Fr. 553, 1874—KARST. Hattsv. I, 437, 1879—SACC. Syll. Fung. V, 860, 1887; Fl. Ital. Crypt., Hymen. 785, 1916—MASS. Brit. Fung. Fl. II, 144, 1893—W. G. SM. Brit. Basid. 162, f. 38, A, 1908—RICKEN, Blätterp. 225, pl. 60, f. 12, 1915—KAUFFM. Agar. Mich. 498, 1918—REA, Brit. Basid. 407, 1922—BRES. Icon. Myc. XVII, pl. 806, 1931.

Derminus (Galera) tener SCHROET. Pilze Schles. I, 580, 1889.

Conocybe tenera FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 357, 1889.

Galera cubensis EARLE, Inform. An. Estac. Centr. Agron. Cuba, I, 237, 1906 (teste MURRILL).

Solitary or gregarious in small groups. Pileus 1–2 cm. broad and high, conical to campanulate; surface glabrous or slightly pubescent, pale ochraceous-buff and atomate in dry weather, pale ochraceous-buff or light ochraceous-buff to pinkish-buff or cinnamon-buff, opaque and slightly striatulate when moist, hygrophanous, slightly darker at the center; context thin, yellowish; lamellae ascending adnate, then almost free, linear, clay color, somewhat crowded or moderately crowded; stipe 7–10 cm. long, 1–2 mm. thick, equal, straight, subconcolorous or slightly paler than the pileus, darker at the base, somewhat shining, striate and powdery above, hollow; spores ferruginous in mass, ellipsoidal or almond shaped, smooth, 10–12.5 × 5–7.5 μ; cystidia flask-shaped.

Hab. on lawn, manured pasture or on ground in woods. Summer to autumn. Ishikari (Sapporo, Nopporo), Iburi (Chitose).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe, North America, Australia.

Jap. name. *Ko-gusa-take* (KAWAMURA).

2. *Galerula campanulata* (BULL. ex FR.) IMAI, comb. nov.

Agaricus campanulatus (non L., SCHAEFF. nec BOLT.) BULL. Champ. Fr. pl. 552, f. 1, 1791 (teste FR.).

Agaricus (Psilocybe) campanulatus FR. Syst. Myc. I, 295, 1821.

Agaricus (Galera) campanulatus FR. Epicr. Myc. 205, 1838.

Agaricus (Galera) ovalis FR. Monogr. Hymen. Suec. I, 389, 1857; Hymen. Eur. 268, 1874—BERK. Outl. Brit. Fung. 162, 1860—CKE. Handb. Brit. Fung. I, 132, 1871; Ill. Brit. Fung. pl. 462, 1886—WINT. Die Pilze, I, 668, 1884.

Galera ovalis GILL. Hymen. Fr. 554, 1874—QUÉL. Ench. Fung. 106, 1886—SACC. Syll. Fung. V, 862, 1887; Fl. Ital. Crypt., Hymen. 786, 1916—MASS. Brit. Fung. Fl. II, 146, 1893—W. G. SM. Brit. Basid. 163, 1908—REA, Brit. Basid. 408, 1922—BRES. Icon. Myc. XVI, pl. 808, 1931.

Galerula ovalis KARST. Hattsv. I, 443, 1879.

Solitary or gregarious in small groups. Pileus 2–3 cm. broad, ovato-campanulate, obtuse; surface ferruginous, becoming yellow when dry, smooth, margin at first straight and adpressed to the stipe; context thin, reddish; lamellae somewhat free, ferruginous, ventricose, broad, crowded; stipe 8–10 cm. long, 2–3 mm. thick, equal, concolorous, tense and straight, slightly striate, very fragile; veil here and there in the form of an annulus, fugacious; spores ferruginous in mass, ellipsoidal, about 10 × 6 μ.

Hab. on dung in pasture or in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. Hiro-ha-kogasa (n. n.).

Pluteolus (FR.) GILL.

Hymen. Fr. 549, 1874.

Agaricus § *Pluteolus* FR. Hymen. Eur. 266, 1874.

Pileus fleshy, very thin, viscid, margin at first straight, adpressed to the stipe. Stipe central, subcartilaginous. Lamellae free, rounded behind. Spores ochraceous or ferruginous in mass.

Type species: *Agaricus reticulatus* PERS. ex FR.

Pluteolus coprophilus PK.

46 Ann. Rep. N. Y. State Mus. 59, 1893—MURRILL, *North Amer. Fl.* X, 187, 1917—KAUFFM. Agar. Mich. 506, 1918.

?*Bolbitius radians* MORGAN, Journ. Cinc. Soc. Nat. Hist. XVIII, 37, 1895.

Solitary or gregarious. Pileus 2–4 cm. broad, conico-campanulate, then expanded nearly plane, depressed on disc; surface glutinous when moist and fresh, light pinkish-cinnamon and with a glutinous pellicle which forms slightly reticulate and radiate veins on the disc, margin striate so far as half length of the radius with avellaneous or wood-brown color; context whitish, very thin, submembranous on the margin, taste and odour none; lamellae free, crowded, pale-cinnamon; stipe 4–8 cm. long, 2–4 mm. thick, slightly enlarged toward the base, pure white, powdery above, powdery or floccose below, hollow; spores cinnamon in mass, ellipsoidal, smooth, slightly truncate at one end, 10–13 × 6–8 μ.

Hab. on *horse-dung*. *Late summer to autumn*. Ishikari (Sapporo).

Distr. Japan (Hokkaido), North America.

Jap. name. *Okina-take* (n. n.).

The fungus in hand seems to have a somewhat intermediate form between *P. coprophilus*, *P. reticulatus* (PERS. ex FR.) GILL. and *P. aleuriatus* (FR.) SACC. The writer, however, identifies it with *P. coprophilus* according to the color of fructification, the size of spores and the habitat which are more similar than to those of the later two species.

Subfam. **Agaricoideae** IMAI, nom. nov.

Pratella FR. Syst. Myc. I, 11, 1821.
Pratellus FR. Syst. Orb. Veg. I, 74, 1825; Epicr. Myc. 212, 1838.
Coprinarius FR. Ibid. 75, 1825.
Pratelli FR. Hymen. Eur. 6 & 277, 1874.
Coprinarii FR. Ibid. 7 & 309, 1874.
Melanosporées GILL. Hymen. Fr. 28, 1874.
Janthinospori QUÉL. Ench. Fung. 109, 1886.
Melanospori QUÉL. Ibid. 118, 1886.
Coprineae P. HENN. in ENGLER & PR. Nat. Pflanzenfam. I, 1**, 204, 1900.
Atrosporae P. HENN. Ibid. 232, 1900.
Amaurosporae P. HENN. Ibid. 234, 1900.

Trama floccosa, carnosa, subcarnosa vel submembranacea, in stipite carnosa vel cartilaginea, non vesiculosa. Sporae in cumulo atro- vel fusco-purpureae, nigricantes.

Tribe **Agariceae** IMAI, nom. nov.

Volvariées ROZE, Bull. Soc. Bot. Fr. XXIII, 51, 1876, p. p.
Psalliotées ROZE, Ibid. 51 & 113, 1876.
Psalliotés FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 352, 1889.
Agaricées KONR. et MAUBL. Icon. Sel. Fung. 28 & 57, 1924.
Psaliotoideae SINGER, Ann. Myc. XXXIV, 340, 1936.

Fructificatio carnosa, annulata vel volvata. Pileus cum stipite carnosi distinctus. Lamellae molles, carnosae, liberae. Sporae in cumulo fusco- vel atro-purpureae.

Agaricus L. ex FR. emend. KARST.

Hattsv. I, xxv, 1879.

Agaricus L. Sp. Pl. 1171, 1753, p. p.

Pratella S. F. GRAY, Nat. Arr. Brit. Pl. I, 626, 1821.

Agaricus § *Psalliota* FR. Syst. Myc. I, 11 & 280, 1821, p. p.; Hymen. Eur. 278, 1874.

Psalliota QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D' Emul. Montb. 2 sér. V, 63 & 139, 1872.

Pratella GILL. Hymen. Fr. 553, 1874.

Pratella § *Psalliota* QUÉL. Ench. Fung. 109, 1886.

Micropsalliota v. HÖHN. Sitzb. Kais. Akad. Wiss. Wien, CXXIII, 1 Abt. 31, 1914.

Fructification with persistent, rarely fugarious, adnate annulus. Pileus fleshy or subfleshy, regular, distinct and easily separable from the fleshy stipe. Stipe central. Lamellae free. Annulus membranous, adnate, persistent, rarely fugacious. Spores fuscous-purple, reddish-purple, blackish-purple or fuscous in mass.

Type species: *Agaricus campestris* L. ex FR.

Key to the sections and species in Hokkaido.

I. Fructification larger, fleshy .... Sect. Edules.
  A. Annulus simple or nearly simple.
    1. Pileus white.
      a. Pileus white, then becoming light reddish brown .... *A. campestris* (1).
      b. Pileus white, then becoming yellowish .... *A. silvicola* (2).
    2. Pileus ochraceous-orange .... *A. jezoensis* (3).
    3. Pileus brownish or brown.
      a. Growing in farm (probably escaped species) ... *A. hortensis* (4).
      b. Growing in woods .... *A. silvaticus* (5).
  B. Annulus double.
    1. Pileus white, becoming yellowish with age or drying .... *A. arvensis* (6).
    2. Pileus with blackish-brown, fibrous scales .... *A. placomyces* (7).
    3. Pileus with ochraceous-tawny, fibrous scales... *A. subrufescens* (8).

II. Fructification smaller; pileus thinly fleshy .... Sect. Minores.
  A. Pileus white, whitish or yellowish.
    1. Pileus 3–4 cm. broad .... *A. comtulus* (9).
    2. Pileus 1.5–2.2 cm. broad .... *A. comptulellus* (10).
  B. Pileus with reddish-brown scales.
    1. Pileus 2.5–5 cm. broad .... *A. diminutivus* (11).
    2. Pileus 1–2.3 cm. broad .... *A. semotellus* (12).

Sect. **Edules** Fr.

Hymen. Eur. 278, 1874.

Fructification larger, fleshy.

1. *Agaricus campestris* L. ex Fr.

Syst. Myc. I, 281, 1821; Epicr. Myc. 213, 1838; Hymen. Eur. 279, 1874 —Berk. *in* Smith, Engl. Fl. V, (2), 106, 1836; Outl. Brit. Fung. 165, pl. 10, f. 2, 1860—Rabenh. Deut. Krypt. Fl. I, 469, 1844—Kickx, Fl. Crypt. Flandr. II, 171, 1867—Corda, Champ. Fr. 89, pl. 20, f. 1, 1870—Cke. Handb. Brit. Fung. I, 137, 1871; Ill. Brit. Fung. pl. 526, 1886; Handb. Austr. Fung. 60, 1892—Karst. Hattsv. I, 484, 1879—Wint. Die Pilze, I, 658, 1884—Sacc. Syll. Fung. V, 997, 1887; Fl. Ital. Crypt., Hymen. 799, 1916 (ut *A. campester*)—Mass. Brit. Fung. Fl. I, 410 1892—Pk. 68 Ann. Rep. N. Y. State Mus. 134, pl. 6, 1895 (ut *A. campester*)—Murrill, Mycologia, XIV, 205, 1922 (ut *A. campester*).

[Tanaka, Bot. Mag. (Tokyo), II, (159), 1889]

Agaricus campestris L. Sp. Pl. 1173, 1753—Pers. Syn. Fung. 418, 1801—Sow. Engl. Fung. III, pl. 305, 1803 (teste Fr.).

[Thunb. Fl. Jap. 346, 1784]

Psalliota campestris Quél. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 140, 1872—Schroet. Pilze Schles. I, 574, 1889—W. G. Sm. Brit. Basid. 172, 1908—Rolland, Atlas Champ. 69, f. 157, 1910—Ricken, Blätterp. 237, pl. 61, f. 6, 1915—Kauffm. Agar. Mich. 240, 1918—Rea, Brit. Basid. 87, 1922—Lange, Agar. Denm. VI, 9, 1926—Bres. Icon. Myc. XVII, pl. 823, 1931—Killerm. Pilze Bayer. VI, 48, 1936.

[P. Henn. Englers Bot. Jahrb. XXXII, 41, 1903—Matsum. Ind. Pl. Jap. I, 165, 1904]

Pratella campestris Gill. Hymen. Fr. 561, cum icone, 1874—Quél. Ench. Fung. 110, 1886.

Gregarious or solitary, edible. Pileus 5–10 cm. broad, globose, then convex, at length becoming plane; surface dry, white, then yellowish or rufescent, silky-even or floccose-squamulose, rarely scaly, margin incurved and with a silky whitish veil at the young stage; context white, rarely becoming reddish or sometimes fuscous when old, fleshy, compact, becoming soft, thick, taste and odour pleasant; lamellae free, whitish, then pinkish, at length purplish brown or blackish brown, broad, tapering toward both ends, ventricose, crowded; stipe 5–10 cm. long, 7–20 mm. thick, equal, white, smooth, solid, hard; annulus white, membranous, rather thick, persistent, sometimes evanescent, rather superior; spores blackish brown in mass, broadly ellipsoidal, smooth, 6–9.5 × 4.5–7 μ.

Hab. *on the ground in pastures, lawns and grassy ground.* Summer to autumn. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido, Honshu), China, Siberia, Europe, North America, Australia.

Jap. name. *Hara-take* (TANAKA).

2. *Agaricus silvicola* (VITT.) SACC.

Syll. Fung. V, 998, 1887; Fl. Ital. Crypt., Hymen. 801, 1916—MURRILL, Mycologia, XIV, 209, 1922.

Agaricus campestris var. *sylvicola* VITT. Fung. Mang. 49, pl. 7, f. 7–9, 1835—FR. Epicr. Myc. 213, 1838; Hymen. Eur. 280, 1874—BERK. Outl. Brit. Fung. 166, 1860—CKE. Handb. Brit. Fung. I, 138, 1871; Ill. Brit. Fung. pl. 529, 1888—KARST. Hattsv. I, 485, 1879—WINT. Die Pilze, I, 658, 1884—MASS. Brit. Fung. Fl. I, 412, 1892.

Psalliota campestris var. *sylvicola* QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 140, 1872—W. G. SM. Brit. Basid. 172, 1908—KAWAMURA, Ill. Jap. Fung. pl. 14, f. 1–2, 1915.

Pratella campestris var. *sylvicola* GILL. Hymen. Fr. 562, cum icone, 1874.

Agaricus abruptus (non FR.) PK. Mem. N. Y. State Mus. III, 163, pl. 59, f. 8–14, 1901.

Agaricus abruptibulbus PK. 94 Bull. N. Y. State. Mus. 36, 1905.

Psalliota silvicola ROLLAND, Atlas Champ. 70, f. 160, 1910—REA, Brit. Basid. 88, 1922—KILLERM. Pilze Bayer. VI, 49, 1936.

[SHIRAI, List Jap. Fung. ed. 3, 304, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 115, 1931]

Psalliota abruptibulba KAUFFM. Agar. Mich. 237, pl. 47, 1918.

Psalliota arvensis var. *silvicola* LANGE Agar. Denm. VI, 7, 1926.

Solitary, edible. Pileus 5–12 cm. broad, subglobose, then convex and umbonate; surface whitish or yellowish, tinged with straw-color at the center or when bruised, or almost entirely colored with yellowish tint when dried, smooth, shining, glabrous or slightly decorated with small fibrous scales or fibrils; margin often appendiculate with partial veil; context white, then brownish, rather thin, odour and taste pleasant; lamellae free, whitish at first, then pinkish, finally blackish-brown, rather narrow, crowded; stipe 6–15 cm. long, 6–15 mm. thick, slightly attenuated upward from the subbulbous base, paler or concolorous, smooth, hollow; annulus membranous, thin, ample, superior, simple or often decorated with floccose patches below; spores dark-brown in mass, ellipsoidal, smooth, 6–7 × 3–4 μ.

Hab. on the ground in woods or in woods borders. Summer to autumn. Oshima (Ônomura), Iburi (Lake side of Shikotsu), Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Shiro-morinokasa* (n. n.).

3. *Agaricus jezoensis* IMAI, sp. nov.

Gregarius vel caespitulus, edulis. Pileo 8–18 cm. lato, subgloboso, dein convexo vel subumbonato, demum subplano, sicco, ochraceo, furfuraceo; carne albida vel flavidula, non mutabili, crassa; odore saporeque nullo; lamellis liberis, albidis, dein roseis, demum atro-purpureis, confertis; stipite 10–18 cm. longo, 10–25 mm. crasso, subaequali, deorsum leviter incrassato, albo vel albido, sericeo, e farcto cavo; annulo membranaceo, amplo, subtus flavo-furfuraceo, supero; sporis in cumulo atrobrunneis, ellipsoideis, levibus, 6.5–8 × 4–5 μ.

Hab. on the ground in open woods or on lawns. Early autumn. Ishikari (Sapporo).

Distr. Endemic.

Jap. name. *Ki-haratake* (n. n.).

The present fungus somewhat resembles *A. augustus* FR. and *A. perrarus* (SCHULZ.) SACC., but it is easily distinguishable by the white stipe and less squamulose pileus.

4. *Agaricus hortensis* (CKE.) IMAI, comb. nov.

Agaricus campestris var. *hortensis* CKE. Handb. Brit. Fung. I, 138, 1871; Ill. Brit. Fung. pl. 527, 1886.

Psalliota arvensis var. *hortensis* W. G. SM. Brit. Basid. 171, 1908—REA, Brit. Basid. 84, 1922.

Psalliota hortensis LANGE, Agar. Denm. VI, 8, 1926.

Agaricus campestris subsp. *hortensis* KONR. et MAUBL. Icon. Sel. Fung. 60, 1927.

Gregarious or caespitose, edible. Pileus 8–11 cm. broad, gibbous or convex, then expanded, finally plane; surface dry, avellaneous, drab or woody-brown, even or cracked at the center, breaking up into fibrous-scales on the margin, with white or whitish veil at first; context fleshy, very thick, compact, whitish, becoming reddish, then brownish when cut, 1.5–2 cm. thick; lamellae free, whitish, then

vinaceous-buff, finally natal-brown, ventricose, equally attenuated at the both ends, crowded; stipe 5–7 cm. long, 14–23 mm. thick, equal or slightly attenuated upward, bulbous when young, whitish, slightly mealy above, even or squamulose below, firm, solid or stuffed; annulus membranous, white, median or slightly inferior, often fugacious, simple; spores dark purple-brown in mass, ellipsoidal, smooth, 6–7.5 × 4.5–5.5 μ.

Hab. on manured ground in farm. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Tsukuri-take* (n. n.).

The present fungus may probably be an escaped one from the cultivation-bed.

5. *Agaricus silvaticus* SCHAEFF. ex FR.

Epicr. Myc. 214, 1838; Hymen. Eur. 280, 1874—RABENH. Deut. Krypt. Fl. I, 468, 1844—BERK. Outl. Brit. Fung. 167, 1860—KICKX, Fl. Crypt. Flandr. II, 173, 1867—CORDA, Champ. Fr. 91, 1870—CKE. Handb. Brit. Fung. I, 138, 1871; Ill. Brit. Fung. pl. 530, 1886; Handb. Austr. Fung. 60, 1892—KARST. Hattsv. I, 485, 1879—WINT. Die Pilze, I, 658, 1884—SACC. Syll. Fung. V, 1000, 1887; Fl. Ital. Crypt., Hymen. 800, 1916—MASS. Brit. Fung. Fl. I, 413, 1892—MURRILL, Mycologia, XIV, 218, 1922.

Agaricus sylvaticus SCHAEFF. Fung. Bavar. IV, Ind. 62, pl. 242, 1774 (teste FR.).

Psalliota sylvatica QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 140, 1872—SCHROET. Pilze Schles. I, 575, 1889 (ut *silvatica*)—W. G. SM. Brit. Basid. 173, 1908—RICKEN, Blätterp. 237, pl. 62, f. 4, 1915 (ut *silvatica*)—KAUFFM. Agar. Mich. 242, 1918 (ut *silvatica*)—REA, Brit. Basid. 89, 1922—KILLERM. Pilze Bayer. VI, 50, 1936 (ut *silvatica*).

Pratella sylvatica GILL. Hymen. Fr. 564, cum icone, 1874—QUÉL. Ench. Fung. 110, 1886 (ut *silvatica*).

Psalliota sanguinaria KARST. Hattsv. II, 232, 1882 (teste LANGE)—LANGE, Agar. Denm. VI, 9, 1926.

Solitary or gregarious, edible. Pileus 7–10 cm. broad, ovate to campanulate, then flattened, often somewhat umbonate, at length very rarely slightly depressed at the center and upturned at the margin; surface at first grayish, then yellowish-white, covered with brown floccose scales, continuous and madder-brown at the center; context white, thick, taste and odour agreeable; lamellae free, whitish at first, then reddish, finally fuscous, ventricose, equally attenuated

at both ends, thin, crowded; stipe 6–10 cm. long, 8–15 mm. thick, equal, but swollen at the base, white or dingy white, glabrous above the annulus, fibrillose below the annulus, hollow; annulus membranous, ample, white, simple, but floccose on the under side; spores fuscous in mass, ellipsoidal, smooth, 5–6.5 × 3.5–4 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Ômorinokasa* (n. n.).

6. *Agaricus arvensis* SCHAEFF. ex FR.

Epicr. Myc. 213, 1838; Hymen. Eur. 278, 1874—RABENH. Deut. Krypt. Fl. I, 468, 1844—BERK. Outl. Brit. Fung. 166, pl. 10, f. 4, 1860—KICKX, Fl. Crypt. Flandr. II, 172, 1867—CORDA, Champ. Fr. 88, pl. 20, f. 2, 1870—CKE. Handb. Brit. Fung. I, 137, 1871; Ill. Brit. Fung. pl. 523, 1886; Handb. Austr. Fung. 62, 1892—KARST. Hattsv. I, 483, 1879—WINT. Die Pilze, I, 659, 1884—SACC. Syll. Fung. V, 994, 1887; Fl. Ital. Crypt., Hymen. 802, 1916—MASS. Brit. Fung. Fl. I, 412, 1892—PK. 68 Ann. Rep. N. Y. State Mus. 140, pl. 8, 1895.

Agaricus pratensis SCOP. Fl. Carn. ed. 2, II, 419, 1772 (teste FR.).

Agaricus arvensis SCHAEFF. Fung. Bavar. IV, Ind. 73, pl. 310–311, 1774 (teste FR.).

Agaricus Georgii WITH. Bot. Arr. Brit. Pl. IV, 206, 1796—SOW. Engl. Fung. III, pl. 304, 1803 (teste FR.).

Agaricus edulis PERS. Syn. Fung. 418, 1801.

Agaricus exquisitus VITT. Fung. Manger. 146, pl. 18, 1833 (teste FR.).

Agaricus (Psalliota) Georgii BERK. in SMITH, Engl. Fl. V, (2), 105, 1836 (teste FR.).

Psalliota arvensis QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 139, 1872—SCHROET. Pilze Schles. I, 575, 1889—W. G. SM. Brit. Basid. 171, 1908—ROLLAND, Atlas Champ. 69, f. 159, 1910—KAUFFM. Agar. Mich. 236, pl. 46, 1918—REA, Brit. Basid. 84, 1922—LANGE, Agar. Denm. VI, 7, 1926—BRES. Icon. Myc. XVII, pl. 821, 1931—KILLERM. Pilze Bayer. VI, 47, 1936.

Pratella arvensis GILL. Hymen. Fr. 563, cum icone, 1874—QUÉL. Ench. Fung. 109, 1886.

Agaricus pratensis SCOP. ex MURRILL, Mycologia, XIV, 208, 1922.

Solitary or gregarious, edible. Pileus 6–16 cm. broad, conical or convex, then expanded; surface dry, subshining, glabrous or fibrilloso-squamulose, whitish, becoming yellowish with age or on drying, slightly darker at the disc; context white or tinged with yellow, thick, compact, firm, at length softer, odour pleasant, taste mild; lamellae free,

*crowded, broad, ventricose, at first pallid, becoming grayish pink, finally blackish-brown; stipe 5–15 cm. long, 8–20 mm. thick, equal, bulbous at the base, whitish, often stained with yellow, shining, glabrous or with small fibrous scales, stuffed or hollow; annulus membranous, large, superior, whitish above, provided with pale-ochraceous-buff colered and radiately splitting thicker patches on the under surface; spores bister color in mass, broadly ellipsoidal, smooth, 7–9 × 4–5 μ.

Hab. on the ground in pastures, fields and woods borders. Summer to autumn. Ishikari (Sapporo, Nopporo), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America, Australia.

Jap. name. *Ôharatake* (KAWAMURA).

7. *Agaricus placomyces* PK.

29 Ann. Rep. N. Y. State Mus. 40, 1878; 48 Ann. Rep. N. Y. State Mus. 142, pl. 9, f. 7–12, 1895—SACC. Syll. Fung. V, 1003, 1887—ATKINS. Mushrooms, ed. 2, 23, f. 21–23, 1903—KAWAMURA, Ill. Jap. Fung. pl. 2, f. 5–7, 1914—PATTERS. & CHARL. Bull. U. S. Dept. Agr. No. 175, 32, pl. 25, f. 1, 1915—KAUFFM. Agar. Mich. 238, 1918—MURRILL, Mycologia, XIV, 218, 1922.

Gregarious or solitary, edible. Pileus 5–15 cm. broad, conical to umbonate, at length sometimes becoming subinfundibuliform by upturning of the margin; surface dry, whitish, covered with fibrous scales of blackish brown, darker and continuous at the center, paler or whitish at the margin; context white, rather thin, taste and odour none; lamellae free, whitish, then pinkish, at length blackish brown, crowded, broader in front; stipe 5–15 cm. long, 6–20 mm. thick, equal or attenuated upward, bulbous at the base, at first whitish, later becoming brownish, silky, powdery above the annulus, striate below, hollow; annulus large, membranous, white, double in young stage; spores blackish brown in mass, broadly ellipsoidal, smooth, 4.5–6 × 3–3.5 μ.

Hab. on the ground in woods, sometimes in the open woods. Summer to autumn. Ishikari (Sapporo, Nopporo), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido, Honshu), China, North America.

Jap. name. *Haratake-modoki* (KAWAMURA).

8. *Agaricus subrufescens* Pk.

46 Ann. Rep. N. Y. State Mus. 25, 1893; 48 Ann. Rep. N. Y. State Mus. 138, pl. 7, 1895—Sacc. Syll. Fung. XI, 70, 1895—Atkins. Mushrooms, ed. 2, 23, 1903—Patters. & Charl. Bull. U. S. Dept. Agr. No. 175, 33, pl. 26, 1915—Murril, Mycologia, XIV, 219, 1922.

Solitary, gregarious or subcaespitose, edible. Pileus 5–15 cm. broad, at first hemispherical, then convex, finally plane, sometimes becoming wavy and split on the margin; surface silky-fibrillose, then becoming conspicuously squamulose with numerous, adpressed small ochraceous-tawny or pale tawny fibrillose scales, disc mars-brown color and not scaly; context white, unchanging color, soft, fragile when matured; lamellae free, crowded, at first whitish, then pinkish, finally blackish-brown; stipe 6–15 cm. long, 1–15 mm. thick, attenuated upward, subbulbous at the base, white and subglabrous above the annulus, floccose-fibrillose to somewhat scaly below the annulus, discolored to brownish with age, stuffed with soft white pith, then hollow; annulus membranous, ample, rather distant, double, glabrous and white above, ornamented with floccose, pale tawny scales below; spores blackish-brown in mass, broadly ellipsoidal, smooth, $6\text{–}7.5 \times 4\text{–}5\,\mu$.

Hab. on humus ground under trees, or on leaf-mold in woods. Autumn. Ishikari (Sapporo), Kushiro (Mt. Meakan).

Distr. Japan (Hokkaido), China, North America.

Jap. name. *Nise-mori-no-kasa* (n. n.).

Sect. Minores Fr.

Hymen. Eur. 281, 1874.

Fructification smaller. Pileus thinly fleshy.

9. *Agaricus comtulus* Fr.

Epicr. Myc. 215, 1838; *Monogr. Hymen.* Suec. I, 407, 1857; Hymen. Eur. 281, 1874—Karst. Hattsv. I, 486, 1879—Wint. Die Pilze, I, 657, 1884—Cke. Ill. Brit. Fung. pl. 533, 1886—Sacc. Syll. Fung. V, 1006, 1887; Fl. Ital. Crypt., Hymen. 797, 1916 (ut *comptulus*)—Mass. Brit. Fung. Fl. I, 416, cum fig., 1892 (ut *comptulus*)—Murrill, Mycologia, XIV, 202, 1922—Lange, Agar. Denm. VI, 11, 1926.

Psalliota comtula Quél. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 140. pl. 24, f. 2, 1872—W. G. Sm. Brit. Basid. 173, 1908—

KAUFFM. Agar. Mich. 244, 1918—REA, Brit. Basid. 90, 1922—BRES. Icon. Myc. XVII, pl. 833, 1931—KILLERM. Pilze Bayer. VI, 51, 1936.

Pratella comtula GILL. Hymen. Fr. 565, 1874—QUÉL. Ench. Fung. 110, 1886.

Psalliota rusiophylla RICKEN, Blätterp. 238, pl. 62, f. 1, 1915.

Solitary or somewhat gregarious, edible. Pileus 3–4 cm. broad, conical to convex, then plane; surface whitish, yellowish or light drab, darker at the center, with adpressed silky fibrils, dry; context subfleshy, thin, white, tinged with yellow, taste and odour mild; lamellae free, crowded, flesh color, then rose, at length becoming dark-brown; stipe 3–5 cm. long, 3–7 mm. thick, attenuated upward, swelling at the base, whitish, tinged with yellow or pink, smooth, with silky stripes above the annulus, silky downy below, hollow; annulus membranous, thin, delicate, superior, yellowish white, often fugacious, irregularly raptured; spores sooty-brown in mass, broadly ellipsoidal, smooth, 4.5–5 × 3–3.5 μ.

Hab. on the ground in woods or grassy places under trees. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Ko-haratake* (n. n.).

10. *Agaricus comptulellus* IMAI, sp. nov.

Gregarius vel solitarius. Pileo 1.5–2.2 cm. lato, e conico convexo, dein plano, demum leviter depresso, sicco, albo, adpresso-fibrilloso, siccitate ochroleuco; lamellis liberis, confertis, e albis roseis, demum fuscis; stipite 2–4 cm. longo, 2–2.5 mm. crasso, aequali, albo, siccitate flavescente, supra annulo glabro, infra fibrilloso; annulo membrano, tenui, supero, albido, fugaci; sporis in cumulo fuscis, late ellipsoideis, levibus, 5–6 × 3–4 μ.

Hab. on the rotting fallen broad leaves on the ground in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Hime-shiro-morinokasa* (n. n.).

The present fungus is an intermediate form between *Ag. comtulus* and *Ag. minimus* (RICK.), but it is easily distinguished from the former by the smaller size and its habitat, and from the latter by the larger size and its habitat.

11. *Agaricus diminutivus* PK.

Bull. Buffalo Soc. Nat. Sci. I, 53, 1873—KAUFFM. Agar. Mich. 245, pl. 50, f. 2, 1918—MURRILL, Mycologia, XIV, 214, 1922.

Solitary or gregarious in small groups. Pileus 2.5–5 cm. broad, convex or conico-convex, then expanded to subumbonate or plane; surface dry, whitish, provided with adpressed reddish-brown silky squamules, but continuous on the center; context whitish, not changing in color, thin, taste and odour none; lamellae free, whitish, then pinkish to brownish, finally dark brown, thin, crowded, ventricose; stipe 3–5 cm. long, 3–7 mm. thick, attenuated upward, slightly enlarged at the base, whitish or yellowish, often tinged with brownish when old or rubbed, glabrous or innately silky floccose, stuffed; annulus membranous, white, superior, thin, fugacious; spores dark purple-brown in mass, ellipsoidal, smooth, 4.5–6.5 × 3–4 μ.

Hab. on the ground under trees. Autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), North America.

Jap. name. *Ko-mori-no-kasa* (n. n.).

12. *Agaricus semotellus* IMAI, sp. nov.

Gregarius vel solitarius. Pileo 1–2.3 cm. lato, e conico convexo, dein umbonato, demum plano, sicco, fibrilloso vel fibrilloso-squamuloso, badio vel castaneo, margine pallidiore, carne alba, tenuissima; lamellis liberis, confertis, e albis fulvis, demum subcastaneis, angustissimis; stipite 2–6 cm. longo, 1.5–3 mm. crasso, sursum leviter attenuato, albo, subflavescente vel subfulvescente, supra annulo glabro sericeo-lucidoque, infra annulo fibrilloso; annulo membrano, fugaci, supero, albo; sporis in cumulo atro-purpureis, late ellipsoideis, levibus, 5–6 × 3–4 μ.

Hab. among the fallen leaves on the ground in woods. Late summer to autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Hime-mori-no-kasa* (n. n.).

Tribe Stropharieae HEIM

Fungi Iberici, 131, 1934.

Armillariées ROXE, Bull. Soc. Bot. Fr. XXIII, 51, 1876, p. p.
Nematolomés FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 369, 1889.
Strophariées KONR. et MAUBL. Icon. Sel. Fung. 28 & 92, 1924, p. p.
Strophariоideae SINGER, Ann. Myc. XXXIV, 340, 1936, p. p.

Fructification fleshy, with annulus or marginal veil. Pileus confluent and homogeneous with the fibrous-fleshy stipe. Lamellae attached with the stipe, fleshy, soft. Spores fuscous- or blackish-purple in mass.

Key to the genera.

1. Fructification with an annulus .... *Stropharia.*
2. Fructification with a marginal veil .... *Hypholoma.*

Stropharia (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 63 et 141, 1872.

Agaricus § *Stropharia* FR. Summa Veg. Scand. 295, 1849.
Geophila § *Stropharia* QUÉL. Ench. Fung. 111, 1886.
Psalliota § *Stropharia* SCHROET. Pilze Schles. I, 573, 1889.

Fructification with a persistent or fugacious, membranous annulus. Pileus fleshy, regular, confluent and homogeneous with the fibrous stipe. Stipe central. Lamellae adnate. Spores fuscous-purple or blackish in mass.

Type species: *Agaricus aeruginosus* CURT. ex FR.

Key to the sections and species in Hokkaido.

I. Pellicle of the pileus even or scaly, most frequently viscid .... Sect. Viscipelles.
   A. Pileus ornamented with scattered floccose scales.
      1. Pileus greenish; scales white .... *S. aeruginosa* (1).
      2. Pileus orange-rufous; scales yellowish .... *S. aurantiaca* (2).
   B. Pileus adpressed fibrillose.
      1. Pileus whitish or yellowish, with brownish fibrils; stipe bulbous .... *S. bulbosa* (3).

2. Pileus with reddish brown colored fibrils; stipe not bulbous.. *S. rugoso-annulata*(4).

C. Pileus glabrous.
1. Pileus large (up to 15 cm. or more broad).
a. Pileus cream-buff to cinnamon; stipe conspicuously fibrillose-scaly .... *S. Hornemanni*(5).
2. Pileus rather small (less than 6 cm. broad).
a. Context becoming blue when bruised........... *S. venenata*(6).
b. Context not changing color.
i. Stipe rather thick.
α. Pileus yellow, not hygrophanous........ *S. coronilla*(7).
β. Pileus ochraceous, hygrophanous....... *S. merdaria*(8).
ii. Stipe slender and long.
α. Pileus not umbonate or slightly obtusely umbonate.
* Pileus remaining hemispheric..... *S. semiglobata*(9).
** Pileus more or less expended..... *S. stercoraria*(10).
β. Pileus decidedly umbonate....... *S. umbonatescens*(11).

Sect. Viscipelles FR.

Hymen. Eur. 283, 1874.

Pellicle of the pileus even or scaly, most frequently viscid.

1. *Stropharia aeruginosa* (CURT. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 141, 1872 —GILL. Hymen. Fr. 577, cum icone, 1874—KARST. Hattsv. I, 488, 1879—SACC. *Syll. Fung. V, 1013, 1887*—MASS. Brit. Fung. Fl. I, 397, 1892—W. G. SM. Brit. Basid. 176, 1908—ROLLAND, Atlas Champ. 72, f. 167, 1910—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII. 1017, pl. 64, 1914—RICKEN, Blätterp. 239, pl. 63, f. 4, 1915—KAUFFM. Agar. Mich. 247, 1918—REA, Brit. Basid. 125, 1922—LANGE, Agar. Denm. V, 32, 1923—BRES. Icon. Myc. XVII, pl. 835, 1931.

[KAWAMURA, Jap. Fung. no. 57, 1929]

Agaricus acuminatus SCOP. Fl. Carn. ed. 2, II, 447, 1772 (teste FR.).

Agaricus viridulus SCHAEFF. Fung. Bavar. IV, Ind. 1, pl. 1, 1774 (teste FR.).

Agaricus aeruginosus CURT. Fl. Lond. 70, 1788—PERS. Syn. Fung. 419, 1801—SOW. Engl. Fung. III, pl. 264, 1803 (teste FR.).

Agaricus (Psalliota) aeruginosus FR. Syst. Myc. I, 286, 1821; Epicr. Myc. 218, 1838—BERK. in SMITH, Engl. Fl. V, (2), 109, 1836; Outl. Brit. Fung. 168, 1860—RABENH. Deut. Krypt. Fl. I, 467, 1844.

Agaricus (Stropharia) aeruginosus FR. Summa Veg. Scand. 295, 1849; Hymen. Eur. 284, 1874—KICKX, Fl. Crypt. Flandr. II, 173, 1867—CKE. Handb.

Brit. Fung. I, 140, 1871; Ill. Brit. Fung. pl. 551, 1886—WINT. Die Pilze, I, 656, 1884.

Geophila (Stropharia) aeruginosa QUÉL. Ench. Fung. 111, 1886.

Psalliota (Stropharia) viridula SCHROET. Pilze Schles. I, 573, 1889.

Stropharia acuminata SACC. Fl. Ital. Crypt., Hymen. 813, 1916—MURRILL, Mycologia, XIV, 128, 1922.

Solitary or gregarious, said to be poisonous. Pileus 4–8 cm. broad, convex, then plane or subumbonate; surface lumiere-green to verdigris-green, then yellowish when dried, smooth, slimy, besprinkled with scattered fugacious scales in young stage, especially on the margin, taste and odour none; lamellae adnate or decurrent by a tooth, rather broad, moderately crowded, whitish or grayish, then purplish brown; stipe 5–10 cm. long, 5–15 mm. thick, attenuated upward or equal, blue then yellowish, viscid, covered with white, fugacious scales below the annulus in young stage, not smooth above, hollow, with white rhizoids at the base; annulus white, fugacious, rather inferior; spores dark brown in mass, ellipsoidal, 7.5–9 × 4.5–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo, Jôzankei), Oshima (Ônomura), Kitami (Oketo), Kushiro (Akan).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Moegitake* (KAWAMURA).

2. *Stropharia aurantiaca* (CKE.) IMAI, comb. nov.

Agaricus thraustus var. *aurantiacus* CKE. Ill. Brit. Fung. pl. 555, 1886.

Stropharia Percevali var. *aurantiaca* SACC. Syll. Fung. V, 1016, 1887.

Stropharia squamosa var. *aurantiaca* MASS. Brit. Fung. Fl. I, 402, 1892—W. G. SM. Brit. Basid. 177, 1908—REA, Brit. Basid. 128, 1922.

Stropharia squamosa var. *thrausta* LANGE, Agar. Denm. V, 33, 1923.

Gregarious or solitary. Pileus 3–7 cm. broad, hemispherical, then expanding subumbonate; surface subviscid to dry, orange-rufous or mars-orange, besprinkled with superficial, fugacious, piloso-fasciculate, light-yellow, concentric scales; context white, slightly reddish immediately beneath pellicle, rather thin; lamellae adnate or sinuate, crowded, cinereous, then dark seal-brown, ventricose, white on the edge; stipe 6–12 cm. long, 4–6 mm. thick, white above the annulus, either squarrose with fibrillose reflexed concolorous scales,

or covered over with dense, strigose concolorous down below the annulus, darker at the base, stuffed or hollow; annulus membranous, thin, distant, persistent; spores purple-brown in mass, oblong-ellipsoidal, smooth, 10–14 × 5–7 μ.

Hab. on the ground or on humus in woods, fields and gardens. Autumn. Ishikari (Sapporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Kabairo-take* (n. n.).

3. *Stropharia bulbosa* IMAI, sp. nov.

Solitaria. Pileo circa 6 cm. lato, convexo, dein plano, leviter depresso, viscidulo, brevi sicco, albido, flavidulo vel fulvidulo, margine albo, squamuloso vel tesserullato-squamuloso, fulvidulo; carne alba, crassa; lamellis adnexis, primo albidis, dein purpureo-cinereis, confertissimis, acie albo-crenulatis; stipite circa 6 cm. longo et 1 cm. crasso, basi bulboso usque at 2 cm. in diam., albo, sericeo-nitente, glabro, apice leviter furfuraceo, farcto; annulo albo, angusto, supero striato-sulcato, persistente; sporis in cumulo atro-purpureis, late ellipsoideis, laevibus, 11–12.5 × 6–7.5 μ.

Hab. on the ground among grasses in field. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Hotei-shiwatsubatake* (n. n.).

The present fungus somewhat resembles *St. squamosa* (FR.) QUÉL. from which it is distinguishable by the bulbous stipe. From *S. coronilla* (BULL. ex FR.) QUÉL., *S. melasperma* (BULL. ex FR.) QUÉL., etc., the fungus is easily distinguished by the nature of pileus and the bulbous stipe.

S. versicolor (FR.) SACC. having a bulbous stipe differs from this fungus by the color of the lamellae.

4. *Stropharia rugosoannulata* FARLOW

in MURRILL, Mycologia, XIV, 139, 1922—BURT, Icon. Farlowiana, pl. 65, 1929.

Solitary or gregarious. Pileus 3–17 cm. broad, convex, then plane, at length upturned at the margin; surface subviscid when wet, shining when dry, densely covered with reddish-brown or dark

brown colored easily separable fibrous scales, sometimes with paler colored scales, or wholly covered on the surface with innate fibrils, margin paler and at first with a distinct white veil; context soft, rather thick, white, taste and odour none; lamellae adnate, at first whitish, then dark purplish gray, crowded; stipe 3–15 cm. long, 5–25 mm. thick, attenuated upward, whitish, then yellowish, silky fibrous, shining, slightly striate, stuffed or slightly hollow, with white rhizoids; annulus white or yellowish, median or superior, narrow, thick, easily separable, radiately ragged on the edge; spores purple-brown in mass, oblong-ellipsoidal or ellipsoidal, smooth, 12–14 × 7–8 μ.

Hab. on the ground, on rotting straw or on dung in woods. Autumn. Ishikari (Nopporo), Oshima (Ônomura).

Distr. Japan (Hokkaido, Honshu), North America.

Jap. name. *Saketsubatake* (n. n.).

5. *Stropharia Hornemanni* (FR.) LUNDELL et NANNF.

Fung. Exsic. Suec. Fasc. I, no. 19, 1934.

Agaricus depilatus PERS. Syn. Fung. 408, 1801 (teste FR.).

Agaricus (*Psalliota*) *Hornemanni* FR. Syst. Myc. I, 285, 1821; Epicr. Myc. 218, 1838.

Agaricus (*Stropharia*) *Hornemanni* FR. Summa Veg. Scand. 295, 1849.

Agaricus (*Stropharia*) *depilatus* FR. Hymen. Eur. 283, 1874.

Stropharia depilata KARST. Hattsv. I, 487, 1879—SACC. Syll. Fung. V, 1012, 1887—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 1016, pl. 62–63, 1914—KAUFFM. Agar. Mich. 249, 1918—REA, Brit. Basid. 125, 1922.

Geophila (*Stropharia*) *depilata* QUÉL. Ench. Fung. 111, 1886.

Subcaespitose or solitary. Pileus 3–15 cm. or more broad, convex to plane, or broadly umbonate, obtuse; surface viscid, smooth, cream-buff or light drab at first, then cinnamon-buff to cinnamon, glabrous, margin incurved, even and appendiculate when young; context firm, whitish, odour none, with somewhat disagreeable taste; lamellae adnate-decurrent, crowded, whitish, soon pale purple-drab or ashy, at length purplish-black, broad; stipe 4–20 cm. long, 8–15 mm. thick, subequal, white to pale yellow, floccose-scaly above the annulus, clothed below the annulus with subsquarrose, lacerate, fibrillose whitish or creamy-yellow scales, often deeply immersed in the substratum at the base, stuffed to hollow; annulus superior, submembranous, persistent, at first white, firm and erect, then becom-

ing deflected and clove-brown, radiately furrowed above, floccose below; spores purple-brown in mass, ellipsoidal, smooth, 9–12 × 5–6.5 μ.

Hab. on rotting roots, logs and stumps of trees, mostly of conifers. Autumn. Ishikari (Mt. Kuradake).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Tsuzuretake* (n. n.).

6. *Stropharia venenata* IMAI, nom. nov.

Stropharia caerulescens IMAI [non (PAT.) SINGER] Trans. Sapporo Nat. Hist. Soc. XII, 148, cum icone, 1932.

Gregarious or caespitose, poisonous. Pileus 1.5–6 cm. or more broad, subconical or convex, then subumbonate, at length plane, slightly upturned at the margin; surface slightly viscid when wet, warm-buff or pinkish-buff to cinnamon-buff or buckthorn-brown at first, then becoming paler, often tinged with green, glabrous, smooth, almost non-striate on the margin; context whitish or grayish, turning to azure-blue when bruised, taste and odour none; lamellae adnate or adnexed, whitish or dingy-yellowish, then purplish-brown, crowded, slightly white-flocculose on the edge; stipe 3–9 cm. long, 5–9 mm. thick, equal, frequently compressed, uneven, silky white, dry, fibrous, especially below the annulus, fibrously stuffed or hollow, with white rhizoids at the base; annulus superior, membranous, or fibrous, very thin, early evanescent, white, silky; sposes fuscous or purplish-brown in mass, ellipsoidal, subfusiform or broadly ellipsoidal, smooth, 7–10.5 × 4.25–7 μ; cystidia none.

Hab. on rotten wood or straw, or on horse-dung. Summer to autumn. Ishikari (Sapporo, District neighbouring to Asahigawa).

Distr. Japan (Hokkaido, Honshu).

Jap. name. *Shibiretake* (IMAI), *Waraitake-modoki* (MATSUURA).

Nematoloma caerulescens PAT. was transferred by R. SINGER to the genus *Stropharia*, therefore it antedates for the Japanese fungus.

7. *Stropharia coronilla* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 255, 1872 —GILL. Hymen. Fr. 578, cum icone, 1874—SACC. Syll. Fung. V, 1014, 1887; Fl.

Ital. Crypt., Hymen. 812, 1916—MASS. Brit. Fung. Fl. I, 399, 1892—W. G. SM. Brit. Basid. 177, 1908—ROLLAND, Atlas Champ. 72, f. 168, 1910—RICKEN, Blätterp. 241, pl. 63, f. 5, 1915—KAUFFM. Agar. Mich. 250, 1918—REA, Brit. Basid. 127, 1922—LANGE, Agar. Denm. V, 33, 1923—BRES. Icon. Myc. XVII, pl. 836, 1931.

Agaricus coronillus BULL. Champ. Fr. pl. 597, 1793 (teste FR.).

Agaricus (Psalliota) coronillus FR. Syst. Myc. I, 282, 1821; Hymen. Eur. 285, 1874—WINT. Die Pilze, I, 655, 1884.

Solitary. Pileus 2–5 cm. broad, hemispherical to convex, at length expanded; surface glabrous, slightly viscid, smooth, whitish or ochraceous, margin even and white floccose or appendiculate; context white, firm, rather thick, odour faint, unpleasant; lamellae adnate or sinuate, crowded, rather broad, pallid to dark violet and at length purplish-black, white fimbriate on the edge; stipe 3–5 cm. long, 3–7 mm. thick, equal or slightly attenuated at the base, dry, smooth, white or slightly yellowish, fibrillose, solid or stuffed then subhollow; annulus distant, thick-membranous, persistent, plicate-sulcate above, white, becoming purplish by deposit of spores; Spores purple-brown in mass, ellipsoidal, smooth, 8–10 × 4–5 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Ko-shiwatsubatake* (n. n.).

8. ***Stropharia merdaria*** (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 142, 1872 —GILL. Hymen. Fr. 576, cum icone, 1874—KARST. Hattsv. I, 491, 1879—SACC. Syll. Fung. V, 1020, 1887; Fl. Ital. Crypt., Hymen. 810, 1916—MASS. Brit. Fung. Fl. I, 403, 1892—W. G. SM. Brit. Basid. 178, 1908—REA, Brit. Basid. 129, 1922 —MURRILL, Mycologia, XIV, 138, 1922—KILLERM. Pilze Bayer. VI, 57, 1936—LANGE, Agar. Denm. XI, 32, 1936.

Agaricus (Psilocybe) merdarius FR. Syst. Myc. I, 291, 1821.

Agaricus (Psalliota) merdarius FR. Epicr. Myc. 220, 1838.

Agaricus (Stropharia) merdarius FR. Hymen. Eur. 286, 1874—CKE. Ill. Brit. Fung. pl. 537, 1886; Handb. Austr. Fung. 62, 1892.

Psilocybe merdaria RICKEN, Blätterp. 251, pl. 66, f. 1, 1915.

Gregarious or somewhat caespitose. Pileus 2.5–5 cm. broad, convex to plane, obtuse; surface glabrous, with a viscid pellicle, moist, hygrophanous, ochraceous-orange at the center, paler on the margin, margin becoming striatulate, often with appendiculate veil; context

whitish, thick at the disc; lamellae adnate with a decurrent tooth, very broad, subcrowded, pallid at the first, then fuscous; stipe 4–7 cm. long, 3–6 mm. thick, equal, tough, ivory-yellow above, cinnamon-buff below, stuffed or hollow; annulus concolorous, incomplete, torn, for the most part commonly adhering to the margin of pileus; spores brownish-black in mass, broadly ellipsoidal, 10–12.5 × 5–7.5 μ, smooth.

Hab. on horse-dung. Autumn. Iburi (Lake side of Shikotsu), Oshima (Ônomura).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America, Australia.

Jap. name. *Kawari-ko-shiwatsubatake* (n. n.).

9. *Stropharia semiglobata* (BATSCH ex FR.) QUEL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 143, 1872—GILL. Hymen. Fr. 576, cum icone, 1874—KARST. Hattsv. I, 492, 1879—SACC. Syll. Fung. V, 1022, 1887; Fl. Ital. Crypt., Hymen. 809, 1916—MASS. Brit. Fung. Fl. I, 404, 1892—ATKINS. Mushrooms, ed. 2, 31, f. 30, 1903—W. G. SM. Brit. Basid. 178, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 1022, 1914—RICKEN, Blätterp. 242, pl. 63, f. 2, 1915—KAUFFM. Agar. Mich. 252, 1918—REA, Brit. Basid. 129, 1922—MURRILL, Mycologia, XIV, 132, 1922—LANGE, Agar. Denm. V, 34, 1923—BRES. Icon. Myc. XVII, pl. 839, 1931.

Agaricus semiglobatus BATSCH, Elench. Fung. Cont. I, 141, pl. 21, f. 110, 1786—SOW. Engl. Fung. III, pl. 248, 1803—PERS. Syn. Fung. 407, 1801 (teste FR.).

Agaricus (Psalliota) semiglobatus FR. Syst. Myc. I, 284, 1821; Epicr. Myc. 220, 1838—BERK. in SMITH, Engl. Fl. V, (2), 108, 1836; Outl. Brit. Fung. 169, 1860—RABENH. Deut. Krypt. Fl. I, 466, 1844.

Agaricus (Stropharia) semiglobatus FR. Summa Veg. Scand. 295, 1849; Hymen. Eur. 287, 1874—CKE. Handb. Brit. Fung. I, 142, 1871; Ill. Brit. Fung. pl. 539, 1886; Handb. Austr. Fung. 62, 1892—WINT. Die Pilze, I, 653, 1884.

Geophila (Stropharia) semiglobata QUÉL. Ench. Fung. 112, 1886.

Solitary or gregarious. Pileus 1–4 cm. broad, subglobose to hemispherical; surface straw-yellow, glabrous, smooth, glutinous, shining when dry; context pallid, then becoming yellowish, soft, odour and taste none; lamellae adnate, very broad, white or olive-gray, soon clouded with the ripening spores, white-floccose on the edge, plane; stipe 5–10 cm. long, 2–4 mm. thick, cylindrical, equal, rarely enlarged at the base, light yellow, smooth, glutinous, fistulose; annulus glutinous when wet, incomplete, superior; spores purplish-brown in mass,

ellipsoidal, smooth, 12–18 × 7–10 μ; sterile cells on the edge of lamellae short-filamentous, 5–6 μ thick, apex obtuse.

Hab. on horse-dung or manured ground in woods or fields. Summer to autumn. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido, Honshu), China, Siberia, Asia Minor, Europe, North America, Australia.

Jap. name. *Shikon-manjugasa* (n. n.).

10. *Stropharia stercoraria* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 143, 1872—GILL. Hymen. Fr. 577, 1874—KARST. Hattsv. I, 492, 1879—SACC. Syll. Fung. V, 1021, 1887; Fl. Ital. Crypt., Hymen. 810, 1916—MASS. Brit. Fung. Fl. I, 404, 1892—W. G. SM. Brit. Basid. 178, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 1021, pl. 67, 1914—RICKEN, Blätterp. 242, 1915—REA, Brit. Basid. 129, 1922—LANGE, Agar. Denm. V, 34, 1923—BRES. Icon. Myc. XVII, pl. 838, 1931.

Agaricus adnatus HUDS. Fl. Angl. ed. 2, 619, 1778 (teste FR. ac MURR.).

Agaricus stercorarius BULL. Champ. Fr. pl. 566, f. 4, 1791—SCHUM. Enum. Pl. Saell. II, 286, 1803 (teste FR.).

Agaricus (Psilocybe) stercorarius FR. Syst. Myc. I, 291, 1821—BERK. in SMITH, Engl. Fl. V, (2), 111, 1836.

Agaricus (Psalliota) stercorarius FR. Epicr. Myc. 220, 1838—RABENH. Deut. Krypt. Fl. I, 467, 1844—BERK. Outl. Brit. Fung. 168, 1860.

Agaricus (Stropharia) stercorarius FR. Summa Veg. Scand. 295, 1849; Hymen. Eur. 287, 1874—CKE. Handb. Brit. Fung. I, 142, 1871; Ill. Brit. Fung. pl. 533, 1886—WINT. Die Pilze, I, 654, 1884.

Geophila (Stropharia) stercoraria QUÉL. Ench. Fung. 112, 1886.

Psalliota (Stropharia) stercoraria SCHROET. Pilze Schles. I, 573, 1889.

Stropharia adnata MURRILL, Mycologia, XIV, 133, 1922.

Gregarious or solitary. Pileus 2–5 cm. broad, conico-campanulate or hemispherical, then expanded to broadly convex or convex, obtuse; surface straw-yellow or citron-yellow, glutinous, buff or whitish and shining or often cracking when dry, glabrous, smooth, pellicle separable, margin paler or whitish; context white or yellowish, taste slightly bitterish, odour none; lamellae adnate with a decurrent tooth, very broad, crowded, white to brownish or greenish black, whitish-flocculose on the edges; stipe 6–14 cm. long, 2–6 mm. thick, equal or slightly enlarged at the base, elongate, white-pruinose above the annulus, citron-yellow or yellowish-white-flocculose, viscid below the annulus, stuffed then hollow; annulus superior, viscid, thin, nar-

row, yellowish, floccose, spreading, evanescent; spores blackish-brown in mass, elongate-ellipsoidal, smooth, 15–20 × 7.5–10 μ; sterile cells on the sides and edge of lamellae lanceolate.

Hab. on horse-dung in woods. Summer to autumn. Ishikari (Sapporo, Jôzankei).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Shikon-azirogasatake* (n. n.).

11. *Stropharia umbonatescens* (PK.) SACC.

Syll. Fung. V, 1021, 1887 (ut *umbonescens*)—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 1023, pl. 65, f. B, 1914—KAUFFM. Agar. Mich. 252, pl. 51, 1918—MURRILL, Mycologia, XIV, 128, 1922.

Agaricus umbonatescens PK. 30 Ann. Rep. N. Y. State Mus. 41, 1878.

Gregarious or solitary. Pileus 1–2.5 cm. broad, conico-campanulate, at length more or less mammilately umbonate; surface yellow (antimony yellow to ochraceous-tawny or buckthorn-brown), brown or reddish-brown (vandyke-brown) at the disc, glabrous, smooth, even or obscurely striate, with viscid pellicle, shining; context thin, pallid; lamellae adnate, crowded, at first whitish, then gray, finally blackish-brown with a slight olivaceous tint; stipe 5–10 cm. long, 1–3 mm. thick, equal or slightly enlarged at the base, yellowish or brownish (paler than the pileus), covered at first with thin, obscure, scaly remnants of the veil up to the fugacious annulus, stuffed then hollow; spores purplish-black in mass, ellipsoidal, smooth, 17.5–20 × 10 μ.

Hab. on horse-dung in woods. Autumn. Ishikari (Nopporo), Tokachi (Lake side of Shikaribetsu), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido), China, North America.

Jap. name. *Shikon-tsuzura-gasatake* (n. n.).

LANGE included the present species in the synonym of *Str. luteonitens* FR. in sensu RICKEN. HARPER suggested that the fungus is very close to *S. mammillata* KALCH. and probably identical with it. KAUFFMAN stated that the present fungus is distinguished from the others by rather foetid odour and larger spores, and especially from *S. paradoxa* P. HENN. which is closely allied, by the shape of pileus and the size of spores.

For the identification with one another of the species mentioned above further critical studies would be required.

Hypholoma (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 63 & 143, 1872.

Agaricus § *Hypholoma* FR. Syst. Myc. I, 287, 1821.
Naematoloma KARST. Hattsv. I, xxv, 1879.
Drosophila § *Hypholoma* QUÉL. Ench. Fung. 115, 1886.
Lacrymaria PAT. Hymen. Eur. 122, 1887.
Cortiniopsis SCHROET. Pilze Schles. I, 566, 1889.
Hypholomopsis EARLE, Bull. N. Y. Bot. Gard. V, 436, 1909.

Pileus fleshy, firm or fragile, regular, with a marginal veil, confluent and subhomogeneous with fleshy or subfleshy stipe. Stipe central, fleshy or fibrous-fleshy. Lamellae sinuate, sinuato-adnate or adnexed. Spores fuscous-purple or purple-black in mass.

Type species: *Agaricus lateritius* SCHAEFF. ex FR.

Key to the subgenera, sections and species in Hokkaido.

I. Spores purplish-fuscous in mass, smooth, pellucid.... Subgen. Euhypholoma.
  A. Fructification more or less yellow (ochraceous or brick-red); pileus somewhat fleshy, not hygrophanous.............. Sect. Flammuloides.
    1. Pileus 3–10 cm. or more broad, fleshy, center brick-red............ .... *H. lateritium*(1).
    2. Pileus 3–7 cm. broad, yellowish; lamellae without greenish tint.... .... *H. epixanthum*(2).
    3. Pileus 1.5–5 cm. broad, yellowish; lamellae with greenish tint...... .... *H. fasciculare*(3).
  B. Fructification white, date-brown or fuscous; pileus rather thin, hygrophanous...................................... Sect. Psathyroides.
    1. Pileus date-brown when moist, fading when dry.
      a. Lamellae at first whitish, soon violaceous, at length fuscous-purple.............................. *H. Candolleanum*(4).
      b. Lamellae at first whitish, then pinkish, at length fuscous...... .... *H. stipatum*(5).
      c. Lamellae at first whitish, then fawn-color, at length fuscous.... .... *H. hydrophyllum*(6).
II. Spores almost black in mass, verrucose, obscure...... Subgen. Lacrymaria.
  A. Pileus fibrillose, tawny-brick-red.................. *H. velutinum*(7).

Subgen. Euhypholoma LANGE

Agar. Denm. V, 38, 1923.

Spores purplish-fuscous in mass, smooth, pellucid.

Sect. Flammuloides LANGE

Agar. Denm. V, 38, 1923.

Fructification more or less yellow; pileus somewhat fleshy, not hygrophanous.

1. *Hypholoma lateritium* (SCHAEFF. ex FR.) SCHROET.

Pilze Schles. I, 572, 1889—SACC. Fl. Ital. Crypt., Hymen. 288, 1916.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 148, 1904—SHIRAI, List Jap. Fung. 43, 1905; ed. 2, 291, 1917; ed. 3, 169, 1927]

Agaricus lateritius (p. p.) SCHAEFF. Fung. Bavar. IV, Ind. 22, pl. 49, f. 6–7, 1774 (teste FR.).

Agaricus (Hypholoma) lateritius FR. Syst. Myc. I, 288, 1821—BERK. in SMITH, Engl. Fl. V, (2), 110, 1836—RABENH. Deut. Krypt. Fl. I, 466, 1844—KICKX, Fl. Crypt. Flandr. II, 174, 1867.

Agaricus (Hypholoma) sublateritius FR. Epicr. Myc. 221, 1838; Hymen. Eur. 290, 1874—BERK. Outl. Brit. Fung. 169, 1860—CKE. Handb. Brit. Fung. I, 143, 1871; Ill. Brit. Fung. pl. 557. 1886.

Hypholoma sublateritium QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 143, 1872—GILL. Hymen. Fr. 572, cum icone, 1874—SACC. Syll. Fung. V, 1028, 1887—MASS. Brit. Fung. Fl. I, 380, 1892—ATKINS. Mushrooms, ed. 2, 26, f. 25, 1903—W. G. SM. Brit. Basid. 180, 1908—ROLLAND, Atlas Champ. 70, f. 162, 1910—KAWAMURA, Ill. Jap. Fung. pl. 1, f. 24–26, 1912—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 1147, pl. 72, 1914—RICKEN, Blätterp. 248, pl. 65, f. 2, 1915—KAUFFM. Agar. Mich. 256, 1918—REA, Brit. Basid. 261, 1922—LANGE, Agar. Denm. V, 40, 1923—BRES. Icon. Myc. XVII, pl. 843–844, 1931—PARKER, Mycologia, XXV, 192, pl. 26, f. 8, 1933—KILLERM. Pilze Bayer. VI, 61, 1936.

[KAWAMURA, Bot. Mag. (Tokyo), XXIII, (166), f. 1, 1909—SHIRAI, List Jap. Fung. ed. 2, 291, 1917; ed. 3, 170, 1927—UMEMURA, Pl. Fujiyama. 373, 1923]

Naematoloma sublateritium KARST. Hattsv. I, 495, 1879.

Geophila (Stropharia) sublateritia QUÉL. Ench. Fung. 113, 1886.

Gregarious or caespitose, edible. Pileus 3–10 cm. or more broad, convex to conical, then conical-umbonate or convex, finally nearly plane; surface tawny-brick-red, paler on the margin, dry or slightly viscid when wet, covered with a superficial, somewhat silky, whitish cloudiness, then smooth, glabrous, margin often provided with a veil in young stage; context thick, compact, white then yellowish, taste mild or slightly bitterish, odour faint; lamellae adnate or sinuate, yellowish, then light brownish drab, at length deep brownish drab; stipe 7–12 cm. or more long, 7–12 mm. thick, attenuated downward

or upward, rarely equal, yellow or yellowish, ferruginous downward, firm, fibrilloso-squamulose, stuffed then hollow; cortina white or yellowish, soon lost; spores bay-brown in mass, ellipsoidal, 6–8 × 4–5 μ.

Hab. on rotten trunks of deciduous trees in woods. Autumn. Oshima (Ônomura), Iburi (Lake side of Shikotsu, Chitose), Ishikari (Sapporo, Nopporo, Jôzankei, Mt. Taisetsu), Tokachi (Urimappu, Lake side of Shikaribetsu), Kushiro (Lake side of Akan, Mt. Meakan), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), China, Siberia, Asia Minor, Europe, North America.

Jap. name. *Kuritake* (KAWAMURA), *Kijitake* (SHIRAI ex P. HENN.).

2. *Hypholoma epixanthum* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 144, 1872—GILL. Hymen. Fr. 574, 1874—SACC. Syll. Fung. V, 1029, 1887; Fl. Ital. Crypt., Hymen. 823, 1916—MASS. Brit. Fung. Fl. I, 381, 1892—W. G. SM. Brit. Basid. 180, 1908—RICKEN, Blätterp. 248, 1915—REA, Brit. Basid. 262, 1922—BRES. Icon. Myc. XVII, pl. 846, 1931.

Agaricus (Hypholoma) epixanthus FR. Epicr. Myc. 122, 1838; Hymen. Eur. 291, 1874—CKE. Handb. Brit. Fung. I, 143, 1871; Ill. Brit. Fung. pl. 560, 1886.

Naematoloma epixanthum KARST. Hattsv. I, 495, 1879.

Geophila (Stropharia) epixantha QUÉL. Ench. Fung. 113, 1886.

Caespitose. Pileus 3–7 cm. broad, convex-plane, obtuse or gibbous, sometimes depressed at the center; surface wet, light yellow, usually darker at the center, slightly silky, then becoming smooth, margin appendiculate with fugacious veil; veil white, silky, fugacious; context yellowish at the pileus, odour unpleasant; lamellae sinuato-adnate, yellowish-white or citrin-yellow, then cinereous or cinereous-purple, crowded, rather broad, edge white-fimbriate; stipe 5–10 cm. long, 6–10 mm. thick, subequal or attenuated from the thickened base, often compressed, floccose-fibrillose, pallid above, fuscous below, apex pruinose, hollow; spores fuscous-purple in mass, ellipsoidal, smooth, 7–8 × 4–5 μ.

Hab. on or about the trunks of trees. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Kachiguritake* (n. n.).

3. *Hypholoma fasciculare* (HUDS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 144, 1872—GILL. Hymen. Fr. 573, cum icone, 1874—SACC. Syll. Fung. V, 1029, 1887; Fl. Ital. Crypt., Hymen. 823, 1916—SCHROET. Pilze Schles. I, 572, 1889—MASS. Brit. Fung. Fl. I, 382, 1892—W. G. SM. Brit. Basid. 181, 1908—ROLLAND, Atlas Champ. 71, f. 163, 1910—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 1149, pl. 75, 1914—RICKEN, Blätterp. 249, pl. 65, f. 1, 1915—KAWAMURA, Ill. Jap. Fung. pl. 16, f. 16–17, 1915—REA, Brit. Basid. 262, 1922—LANGE, Agar. Denm. V, 40, 1923—BRES. Icon. Myc. XVII, pl. 847, 1931—PARKER, Mycologia, XXV, 194, 1933.

[P. HENN. Hedw. XXXIX, (156), 1900; in ENGLERs Bot. Jahrb. XXXII, 40, 1903—MATSUM. Ind. Pl. Jap. I, 148, 1904—SHIRAI, List Jap. Fung. 43, 1905; ed. 2, 289, 1917; ed. 3, 169, 1927—UMEMURA, Bot. Mag. (Tokyo), XXVI, (152), 1912—YASUDA, Bot. Mag. (Tokyo), XXXVII, (205), 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 115, 1931]

Agaricus lateritius (p. p.) SCHAEFF. Fung. Bavar. IV, Ind. 22, pl. 49, f. 1–5, 1774.

Agaricus fascicularis HUDS. Fl. Angl. ed. 2, 615, 1778—SOW. Engl. Fung. III, pl. 285, 1803 (teste FR.).

Agaricus (Hypholoma) fascicularis FR. Syst. Myc. I, 288, 1821; Epicr. Myc. 122, 1838; Hymen. Eur. 291, 1874—BERK. in SMITH, Engl. Fl. V, (2), 111, 1836; Outl. Brit. Fung. 169, pl. 11, f. 1, 1860—RABENH. Deut. Krypt. Fl. I, 465, 1844—KICKX, Fl. Crypt. Flandr. II, 175, 1867—CKE. Handb. Brit. Fung. I, 144, 1871; Ill. Brit. Fung. pl. 561, 1886; Handb. Austr. Fung. 62, 1892.

Naematoloma fasciculare KARST. Hattsv. I, 496, 1879.

Geophila (Stropharia) fascicularis QUÉL. Ench. Fung. 113, 1886.

Caespitose, usually harmless, but at times poisonous. Pileus 1.5–5 cm. broad, convex to expanded, obtuse, or umbonate; surface light yellow, center darker or brownish, often with bluish tint, dry, smooth, glabrous, sometimes with radiate shrinkages at the center, often provided with a fibrillose veil at the margin; context yellow, thin, taste slightly bitter; lamellae adnexed, very crowded, linear, 2–3 mm. wide, sulphur-yellow, then greenish, finally olive-brown; stipe 3–8 cm. long, 2–5 mm. thick, equal, smooth, glabrous, or fibrillose, sulphur-color to lemon color, hollow; cortina yellow-white, fibrillose, soon disappearing; spores purple-brown in mass, ellipsoidal, $5–7.5 \times 4–5 \mu$.

Hab. on dead wood in woods. Summer to autumn. Ishikari (Sapporo, Nopporo, Jôzankei, Asahigawa, Sôunbetsu), Kushiro (Lake side of Akan), Kitami (Oketo forest), Oshima (Ônomura), Iburi (Lake side of Shikotsu, Chitose).

Distr. Japan (Hokkaido, Honshu, Kyushu), Asia Minor, Europe, North America, Australia.

Jap. name. *Niga-kuritake* (KAWAMURA), *Yanagitake* (SHIRAI ex P. HENN.).

Sect. Psathyroides LANGE

Agar. Denm. V, 38, 1923.

Fructification white, date-brown or fuscous; pileus rather thin, hygrophanous.

4. *Hypholoma Candolleanum* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 146, 1872—GILL. Hymen. Fr. 570, 1874—KARST. Hattsv. I, 501, 1879—SACC. Syll. Fung. V, 1038, 1887; Fl. Ital. Crypt., Hymen. 819, 1916—MASS. Brit. Fung. Fl. I, 391, 1892—W. G. SM. Brit. Basid. 183, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 1156, pl. 80, 1914—RICKEN, Blätterp. 246, pl. 64, f. 4, 1915—KAUFFM. Agar. Mich. 264, 1918—REA, Brit. Basid. 266, 1922—LANGE, Agar. Denm. V, 42, 1923—KONR. & MAUBL. Icon. Sel. Fung. pl. 43, 1924, p. p.—BRES. Icon. Myc. XVIII, pl. 852, 1931—PARKER, Mycologia, XXV, 177, pl. 26, f. 12; pl. 27, f. 18; pl. 28, f. 29, 1933.

Agaricus violaceo-lamellatus DC. Fl. Fr. II, 143, 1815 (teste FR.).

Agaricus Candollianus FR. Obs. Myc. II, 182, 1818.

Agaricus (Psathyra) Candollianus FR. Syst. Myc. I, 296, 1821, p.p.—BERK. in SMITH, Engl. Fl. V, (2), 113, 1836.

Agaricus (Hypholoma) Candollianus FR. Epicr. Myc. 224, 1838; Hymen. Eur. 295, 1874 (ut *Candolleanus*)—RABENH. Deut. Krypt. Fl. I, 465, 1844—BERK. Outl. Brit. Fung. 170, 1860—CKE. Handb. Brit. Fung. I, 145, 1871; Ill. Brit. Fung. pl. 546, 1886; Handb. Austr. Fung. 63, 1892.

Drosophila (Hypholoma) Candolleana QUÉL. Ench. Fung. 115, 1886.

Caespitose or densely gregarious, edible. Pileus 3–7 cm. broad, campanulate then expanded to convex, at length flattened, obtuse; surface at first pale honey-yellow or date-brown, then fading to whitish, but remaining ochraceous at the disc, glabrous, but pruinose under lens, even or slightly wrinkled when dry, margin at first appendiculate with the fragments of white fugacious veil; veil white, fugacious, appendiculate; context white, thin, odour and taste none; lamellae rounded-adnexed, then separating, at first whitish, rather soon violaceous, at length fuscous-purple, crowded, narrow, edge at

first white-fimbriate; stipe 4–7 cm. long, 4–8 mm. thick, equal, cylindrical, white, fibrillose, apex striate and furfuraceous, hollow, rigid, fragile; spores fuscous-purple in mass, ellipsoidal, smooth, 10–12.5 × 6–7 μ.

Hab. on the ground or around dead tree trunks. Summer to autumn. Ishikari (Sapporo, Nopporo), Oshima (Ônomura).

Distr. Japan (Hokkaido), Siberia, Asia Minor, Europe, North America, Australia.

Jap. name. *Ô-itachitake* (n. n.).

5. *Hypholoma stipatum* (PERS. ex FR.) IMAI, comb. nov.

Agaricus appendiculatus BULL. Champ. Fr. pl. 392, 1791—SOW. Engl. Fung. III, pl. 324, 1803 (teste FR.).

Agaricus stipatus PERS. Syn. Fung. 423, 1801 (teste FR.).

Agaricus (Psathyra) stipatus FR. Syst. Myc. I, 296, 1821, p. maj. p.

Agaricus (Hypholoma) appendiculatus FR. Epicr. Myc. 224, 1838; Hymen. Eur. 296, 1874—BERK. Outl. Brit. Fung. 170, pl. 11, f. 3–4, 1860—CKE. Handb. Brit. Fung. I, 146, 1871; Ill. Brit. Fung. pl. 547, 1886.

Hypholoma appendiculatum QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 146, 1872—GILL. Hymen. Fr. 570, cum icone, 1874—KARST. Hattsv. I, 502, 1879—SACC. Syll. Fung. V, 1039, 1887; Fl. Ital. Crypt., Hymen. 820, 1916—SCHROET. Pilze Schles. I, 571, 1889—MASS. Brit. Fung. Fl. I, 392, 1892—ATKINS. Mushrooms, ed. 2, 27, f. 26–27, 1903—W. G. SM. Brit. Basid. 183, 1908—RICKEN, Blätterp. 247, pl. 64, f. 5, 1915—KAWAMURA, Ill. Jap. Fung. pl. 16, f. 1–5, 1915—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVIII, 413, pl. 22, f. A, B, C, 1916—KAUFFM. Agar. Mich. 264, 1918—REA, Brit. Basid. 267, 1922—BRES. Icon. Myc. XVIII, pl. 853, 1931—PARKER, Mycologia, XXV, 183, 1933.

[P. HENN. ENGLERs Bot. Jahrb. XXXI, 738, 1902; Ibid. XXXII, 40, 1903; Ibid. XXXIV, (600), 1905—SHIRAI, List Jap. Fung. 43, 1905; ed. 2, 289, 1917; ed. 3, 169, 1927—UMEMURA, Pl. Fujiyama. 373, 1923]

Drosophila (Hypholoma) appendiculata QUÉL. Ench. Fung. 116, 1886.

Caespitose or densely gregarious, edible. Pileus 2–6 cm. broad, campanulate-hemispherical, then expanded, at length nearly plane, obtuse; surface varying in color, from white or pale-yellow to light brown or dark honey-brown, fading when dry or old, hygrophanous, glabrous or whitish-pulverulent, rarely floccose-scaly, slightly wrinkled and almost atomate when dry, margin slightly striatulate, appendiculate with the fragments of white, flocculent, fugacious veil; veil white, appendiculate, fugacious or rarely subpersistent; context pallid, subconcolorous, thin, odour and taste none; lamellae subadnate or broadly adnate, white at first, then pinkish, at length fuscous, at first fimbriate on the edge, crowded, narrow; stipe 3–

8 cm. long, 3–6 mm. thick, equal, cylindrical, fistulose, straight or curved, white, glabrous, silky-shining, pruinose at the apex, fragile; spores fuscous-purple in mass, ellipsoidal, smooth, 7–8 × 4–5 μ.

Hab. on the ground or around dead tree trunks. Summer to autumn. Ishikari (Sapporo, Nopporo, Jôzankei).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Itachi-take* (KAWAMURA).

6. *Hypholoma hydrophilum* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul Montb. 2 sér. V, 146, 1872 —KARST. Hattsv. I, 502, 1879—SACC. Syll. Fung. V, 1041, 1887; Fl. Ital. Crypt., Hymen. 821, 1916—MASS. Brit. Fung. Fl. I, 394, 1892—W. G. SM. Brit. Basid. 184, 1908—RICKEN, Blätterp. 247, pl. 64, f. 6, 1915—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVIII, 417, pl. 24, 1916—KAUFFM. Agar. Mich. 266, 1918—REA, Brit. Basid. 268, 1922—LANGE, Agar. Denm. V, 43, 1923—KONR. Bull. Soc. Myc. Fr. XLI, 57, 1925; KONR. et MAUBL. Icon. Sel. Fung. pl. 42, 1927—BRES. Icon. Myc. XVIII, pl. 854, 1931—PARKER, Mycologia, XXV, 181, pl. 26, f. 10; pl. 27, f. 22; pl. 28, f. 28; pl. 30, f. 36, 1933.

Agaricus hydrophilus BULL. Champ. Fr. pl. 511, 1791 (teste FR.).

Agaricus (Psathyra) stipatus β *hydrophilus* FR. Syst. Myc. I, 296, 1821.

Agaricus (Hypholoma) hydrophilus FR. Epicr. Myc. 225, 1838; Monogr. Hymen. Suec. I, 427, 1857—CKE. Handb. Brit. Fung. I, 146, 1871; Ill. Brit. Fung. pl. 605, f. B, 1886.

Bolbitius hydrophilus FR. Hymen. Eur. 333, 1874—GILL. Hymen. Fr. 594, cum icone, 1874.

Drosophila (Hypholoma) hydrophila QUÉL. Ench. Fung. 116, 1886.

Caespitose or densely gregarious. Pileus 2.5–5 cm. broad, convex, or slightly umbonate, then expanded; surface date-brown (sayal-brown to snuff-brown) when wet, ochraceous-buff or light ochraceous-buff and darker on the disc when dry, hygrophanous, subpruinose, even or pellucid-substriate on the margin when dry, wrinkled when dry, margin entire at first, finally often undulate and splitting, appendiculate with a white, very fugacious veil; context thin, watery-brownish when wet, whitish when dry, odour and taste almost none; lamellae adnexed, whitish at first, then fawn color, finally sorghum-brown, crowded, ventricose, thin; stipe 3–6 cm. long, 2.5–5 mm. thick, equal or slightly attenuated upward, shining, white or whitish, becoming somewhat brownish, especially below, subpruinose above, fibrillose below, rigid, fragile, hollow; spores purplish-brown in mass, ellipsoidal, 5–6.5 × 2.5–3.5 μ.

Hab. on or around rotten trunks in woods. Autumn. Ishikari (Nopporo, Sapporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Musasabi-take* (n. n.).

Subgen. **Lacrymaria** LANGE

Agar. Denm. V, 39, 1923.

Lacrymaria PAT. Hymen. Eur. 122, 1887.

Spores almost black in mass, verrucose, obscure.

7. ***Hypholoma velutinum*** (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 145, 1872—GILL. Hymen. Fr. 569, cum icone, 1874—KARST. Hattsv. I, 499, 1879—SACC. Syll. Fung. V, 1034, 1887; Fl. Ital. Crypt., Hymen. 817, 1816—MASS. Brit. Fung. Fl. I, 388, 1892—W. G. SM. Brit. Basid. 182, 1908—HARPER, Trans. Wisc. Acad. Sci. Arts & Lett. XVII, 1154, pl. 79, 1914—KAUFFM. Agar. Mich. 260, pl. 53, 1918—REA, Brit. Basid. 265, 1922—PARKER, Mycologia, XXV, 200, pl. 31, f. 38, 1933.

?*Agaricus lacrymabundus* SOW. Engl. Fung. I, pl. 41, 1797 (teste FR.).

Agaricus velutinus PERS. Syn. Fung. 409, 1801 (teste FR.).

Agaricus (*Hypholoma*) *lacrymabundus* β *velutinus* FR. Syst. Myc. I, 288, 1821.

Agaricus (*Hypholoma*) *velutinus* FR. Epicr. Myc. 223, 1838; Monogr. Hymen. Suec. I, 424, 1857; Hymen. Eur. 293, 1874—RABENH. Deut. Krypt. Fl. I, 465, 1844—BERK. Outl. Brit. Fung. 170, pl. 11, f. 2, 1860—CKE. Handb. Brit. Fung. I, 145, 1871; Ill. Brit. Fung. pl. 563, 1886.

Geophila (*Stropharia*) *lacrymabunda* QUÉL. Ench. Fung. 113, 1886—MURRILL, Mycologia, XIV, 67, 1922.

?*Lacrymaria lacrymabundum* PAT. Hymen. Eur. 123, 1887.

Lacrymaria velutinum PAT. Ibid. 123, 1887—KONR. et MAUBL. Icon. Sel. Fung. 90, 1924–35.

Cortiniopsis lacrymabundus SCHROET. Pilze Schles. I, 566, 1889.

Hypholoma lacrymabundum RICKEN, Blätterp. 245, pl. 64, f. 3, 1915.

Hypholoma lacrymabundum LANGE, Agar. Denm. V, 44, 1923.

Hypholoma lacrymabundum BRES. Icon. Myc. XVII, pl. 849, 1931.

Gregarious, caespitose or rarely solitary, not poisonous. Pileus 5–11 cm. broad, campanulate then convex, or at times obtusely umbonate; surface fulvous to isabelline with intermediate shades, darker at the center, covered when young with adpressed, matted fibrils,

which may disappear with age, or collect into small squamules, the pellicle cracking areolately at times, margin not striate, lanoso-fimbriate with veil which disappears with age; context thin, yellowish or brownish, taste mild or slightly disagreeable, odour not characteristic; lamellae sinuato-adnexed or adnate, somewhat ventricose, rather crowded, yellowish, shading to umber and spotted with black and rusty-brown as the spores mature, whitish on the edges; stipe 5–14 cm. long, 5–14 mm. thick, equal or slightly enlarged below, subconcolorous, nearly white-furfuraceous at the apex, silky fibrillose, hollow; spores almost black in mass, very dark purplish-umber under lens, lemon or amygdaline shaped, tuberculate, apiculate, 8–12 × 5–7.5 μ; cystidia scattered on the sides of lamellae, abundant, cylindrical-subcapitate.

Hab. on damp ground in rich humus in woods. Summer to autumn. Ishikari (Sapporo, Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Mujina-take* (IMAZEKI).

Tribe Gomphidieae HEIM

Fungi Iberici 68, 1934.

Gomphidiaceae SINGER, Ann. Myc. XXXIV, 326, 1936.

Fructification fleshy, with a fugacious marginal veil or cortina. Pileus viscid or dry, confluent and subhomogeneous with the subfleshy stipe. Lamellae decurrent, gelatinous-fleshy, soft. Spores fuscous, olivaceous or blackish in mass.

Gomphidius FR.

Genera Hymen. 8, 1836; Epicr. Myc. 319, 1838.

Agaricus § *Gomphus* FR. Syst. Myc. I, 314, 1821.

Fructification fleshy, with a fugacious marginal veil or cortina. Pileus usually viscid, rarely dry, confluent and subhomogeneous with the subfleshy stipe. Lamellae decurrent, gelatinous-fleshy, soft. Spores fuscous, olivaceous or blackish in mass.

Type species: *Agaricus gelatinosus* SCHAEFF. ex FR.

Key to the sections and species in Hokkaido.

I. Surface of pileus viscid.............................. Sect. Viscigomphus.
   1. Pileus 5–15 cm. broad, *pileus and stipe fuscous-rufous; lamellae olivaceous* then fuscous-purple.............................. *G. rutilus* (1).
   2. Pileus 2–5 cm. broad, pinkish-cinnamon or apricot-buff with paler margin; lamellae whitish, then cinereous.............. *G. gracilis* (2).

II. Surface of pileus dry, tomentose.................... Sect. Floccigomphus.
   1. Pileus and stipe pale yellow-orange or ochraceous, cottony tomentose.... .... *G. tomentosus* (3).

Sect. **Viscigomphus** IMAI, sect. nov.

Pileus viscidus.

1. *Gomphidius rutilus* (SCHAEFF. ex FR.) IMAI, comb. nov.

Agaricus viscidus L. Sp. Pl. 1173, 1753 (teste FR.).

Agaricus rutilus SCHAEFF. Fung. Bavar. IV, Ind. 24, pl. 55, 1774 (teste FR.).

Agaricus (Gomphus) rutilus FR. Syst. Myc. I, 315, 1821.

Gomphidius viscidus FR. Epicr. Myc. 319, 1838; Monogr. Hymen. Suec. II, 150, 1863; Hymen. Eur. 400, 1874—BERK. Outl. Brit. Fung. 196, 1860—KICKX, Fl. Crypt. Flandr. II, 194, 1867—CKE. Handb. Brit. Fung. I, 205, 1871; Ill. Brit. Fung. pl. 881, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 184, 1872; Ench. Fung. 91, 1886—GILL. Hymen. Fr. 624, cum icone, 1874—KARST. Hattsv. I, 526, 1879—WINT. Die Pilze, I, 575, 1884—SACC. Syll. Fung. V, 1138, 1887; Fl. Ital. Crypt., Hymen. 663, 1916—SCHROET. Pilze Schles. I, 524, 1889—MASS. Brit. Fung. Fl. I, 347, 1892—W. G. SM. Brit. Basid. 250, 1908—ROLLAND, Atlas Champ. 72, f. 166, 1910—KAWAMURA, Ill. Jap. Fung. pl. 5, f. 13–15, 1913—RICKEN, Blätterp. 8, pl. 3, f. 3, 1915—REA, Brit. Basid. 325, 1922—BRES. Icon. Myc. XIV, pl. 673, 1930.

[SHIRAI, List Jap. Fung. ed. 2, 261, 1917; ed. 3, 152, 1927—YASUDA, Bot. Mag. (Tokyo), XXXVI, (22), 1922]

Solitary or gregarious, edible. Pileus 5–15 cm. broad, campanulate or obconical, then expanded, umbonate; surface slightly viscid, fuscous-rufous, paler and shining when dry; context reddish, deep yellow in the lower two-thirds of the stipe, taste mild, often slightly astringent; lamellae deeply decurrent, olivaceous, then fuscous-purple, distant, often branched, edge often paler; stipe 7–12 cm. long, 2–3 cm. thick, equal or attenuated downward, concolorous, paler, yellowish at the base, fibrillose-scaly, slightly viscid; cortina floccose, forming a fugacious ring; spores brownish olivaceous, subfusiform, 18–22 × 6–7 μ; cystidia obtusely cylindrical, apex often subcapitate.

Hab. on the ground in woods, especially in coniferous woods. Autumn. Oshima (Ônomura), Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Siberia, Asia Minor, Europe, North America.

Jap. name. *Kugi-take* (KAWAMURA).

2. *Gomphidius gracilis* BERK. et BR.

in BERK. Outl. Brit. Fung. 196, pl. 12, f. 7, 1860—FR. Hymen. Eur. 400, 1874—CKE. Ill. Brit. Fung. pl. 883, 1888—SACC. Syll. Fung. V, 1138, 1887; Fl. Ital. Crypt., Hymen. 662, 1916—MASS. Brit. Fung. Fl. I, 349, 1892—W. G. SM. Brit. Basid. 251, 1908—REA, Brit. Basid. 326, 1922—BRES. Icon. Myc. XIV, pl. 675, 1930.

Gregarious, edible. Pileus 2.5–5 cm. broad, conical or convex, then nearly plane, finally slightly depressed at the center; surface smooth, glabrous, glutinous, pinkish-cinnamon or apricot-buff at the center, light pinkish-cinnamon at the margin, at length spotted with blackish or dark-brownish color, especially near the margin, finally the spots often become a large irregular black border; context whitish, yellowish or reddish; lamellae decurrent, whitish, cinereous, arched, forked, thick, obtuse, clothed with short, washy bister hairs which are visible under a lens; stipe 5–10 cm. long, 4–8 mm. thick, almost equal, flexuous, pale above, yellowish below, apex white squamulose, floccose or slightly scaly at the median and basal parts, at length becoming black spotted or streaked, hollow or stuffed; spores olive-brown in mass, fusiform, $15–22.5 \times 6.25–7.5\ \mu$.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo), Oshima (Ônomura).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Ki-ôgitake* (n. n.).

Sect. **Floccigomphus** IMAI, sect. nov.

Pileus siccus, tomentosus.

3. *Gomphidius tomentosus* MURRILL

Mycologia, IV, 307, 1912—KAUFFM. Mycologia, XVII, 124, 1925—TROTT. in SACC. Syll. Fung. XXIII, 293, 1925.

Gregarious or solitary, edible. Pileus 2–9 cm. broad, mostly 3–5 cm., conical to umbonate, sometimes then becoming umbilicate and finally subinfundibuliform; surface dry, capucin-buff or pale yellow-orange to ochraceous-color, darker at the disc, becoming pinkish brown on drying, cottony tomentose, margin incurved, tomentose and with fibrillose veil; context soft, ochraceous, becoming pinkish on drying, taste mild, odour agreeable; lamellae decurrent, distant, at times forked near the stipe and median portion of lamellae, rather thick, entire, subochraceous, then drab color; stipe 6–20 cm. long, 7–20 mm. thick, attenuated upward, or sometimes nearly attenuated at the base, subconcolorous and tomentose, atuffed or solid, cchraceous and soft within; cortina fibrillose at first, fugacious; spores black in mass, oblong or oblong-fusiform, 15–20 × 7.5–8.75 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), North America, ?Europe.

Jap. name. *Fusa-kugi-take* (n. n.).

To judge from the description and figures Humbolt's fungus from France hardly belongs here.

Tribe. Coprineae HEIM

Fungi Iberici, 132, 1934.

Coprinidées ROZE, Bull. Soc. Bot. Fr. XXIII, 51, 1876.
Pratellés FAYOD, Ann. Sci. Nat., Bot. 7 sér. IX, 376, 1889, p. p.
Coprinoidées FAYOD, Ibid. 378, 1889.
Coprinées KONR. et MAUBL. Icon. Sel. Fung. 28 & 63, 1924, p. p.

Fructification with or without partial or universal veil. Pileus fleshy or membranous, confluent with, but for the most part heterogenous from, the subfleshy or cartilaginous stipe. Stipe central, subfleshy or cartilaginous. Lamellae free or attached, deliquescent or not. Spores fuscous- or blackish-purple or black in mass.

Key to the genera.

I. Pileus fleshy or fleshy-membranous; lamellae adnate or sinuate-adnate, not autodigested.
  A. Margin of pileus at first incurved or exceeding the lamellae.
    1. Spores purple or fuscous in mass .... *Psilocybe.*
    2. Spores blackish or black in mass .... *Panaeolus.*

B. Margin of pileus straight, at first adpressed to the stipe.
  1. Spores purple or fuscous in mass...................... *Psathyra.*
  2. Spores blackish or black in mass..................... *Psathyrella.*

II. Pileus membranous or fleshy-membranous, fragile; lamellae autodigested; spores blackish or black in mass............................ *Coprinus.*

Psilocybe (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 63 & 147, 1872.

Agaricus § *Psilicybe* FR. Syst. Myc. I, 289, 1821.

Pileus fleshy, regular, margin at first incurved. Stipe central cartilaginous. Lamellae adnate, sinuato-adnate or adnexed. Spores fuscous-purple in mass.

Type species: *Agaricus foenisecii* PERS. ex FR.

Sect. Rigidae FR.

Syst. Myc. I, 294, 1821; Epicr. Myc. 225, 1838.

Pileus scarcely with a pellicle, but the flesh most frequently scissile, hygrophanous. Veil none. Stipe rigid. Lamellae adnexed, very rarely adnate.

Psilocybe foenisecii (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 147, 1872—GILL. Hymen. Fr. 583, cum icone, 1874—KARST. Hattsv. I, 508, 1879—SACC. Syll. Fung. V, 1055, 1887; Fl. Ital. Crypt., Hymen. 833, 1916—MASS. Brit. Fung. Fl. I, 377, 1892—W. G. SM. Brit. Basid. 189, 1908—RICKEN, Blätterp. 256, pl. 66, f. 8, 1915—KAUFFM. Agar. Mich. 283, pl. 54, 1918—REA, Brit. Basid. 369, 1922—BRES. Icon. Myc. XVIII, pl. 862, 1931.

Agaricus foenisecii PERS. Icon. Desc. Fung. II, 42, pl. 11, f. 1, 1800; Syn. Fung. 411, 1801 (teste FR.).

Agaricus (*Psilocybe*) *foenisecii* FR. Syst. Myc. I, 295, 1821; Epicr. Myc. 227, 1838; Hymen. Eur. 303, 1874—BERK. in SMITH, Engl. Fl. V, (2), 112, 1836; Outl. Brit. Fung. 171, pl. 11, f. 5, 1860—RABENH. Deut. Krypt. Fl. I, 464, 1844—KICKX, Fl. Crypt. Flandr. II, 177, 1867—CKE. Handb. Brit. Fung. I, 149, 1871; Ill. Brit. Fung. pl. 590, 1886; Handb. Austr. Fung. 64, 1892—WINT. Die Pilze, I, 644, 1884.

Drosophila (*Psathyra*) *foenisecii* QUÉL. Ench. Fung. 117, 1886.

Coprinarius foenisecii SCHROET. Pilze Schles. I, 565, 1889.
Panaeolus foenisecii KÜHNER, Contr. Etude Hymen. 187, 1926—KONR. et MAUBL. Icon. Sel. Fung. pl. 50, f. 2, 1929—LANGE, Agar. Denm. XI, 24, 1936.

Gregarious or scattered, edible. Pileus 1–3 cm. broad, campanulato-convex or subhemispherical, obtuse, seldom finally plane; surface hygrophanous, smooth, glabrous, dark grayish-brown to smoky-fuscous and even when moist, sometimes rufescent, zonate on drying, drab-tan-color to buff when dry, veil entirely lacking; context pallid, thin, taste and odour none; lamellae adnate or adnexed, subdistant, broad, ventricose, wood-brown, then natal-brown or bone-brown, white fimbriate on edges; stipe 3–8 cm. long, 1.5–4 mm. thick, equal, rigid-elastic, glabrous, even, pruinose at the apex, pallid to subrufescent, hollow; spores cinereous-purple in mass, broadly ellipsoidal or almond-shaped, slightly punctate, $12.5\text{–}16 \times 7.5\text{–}9\ \mu$.

Hab. on the ground among grasses in lawns, roadsides, grassy places in woods, meadows, and pastures. Late spring to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe, North America, Australia.

Jap. name. *Hime-shibafu-take* (n. n.).

Panaeolus (FR.) QUÉL.

Champ. Jura Vosg. I, *in Mém. Soc. D'Emul. Montb.* 2 sér. V, 63 & 151, 1872.

Campanularius ROUSSEL, Fl. Calvados ed. 2, 64, 1806 (sec. EARLE).
Agaricus § *Panaeolus* FR. Epicr. Myc. 234, 1838.
Chalymmota KARST. Hattsv. I, xxvii, 1879.
Coprinarius § *Panaeolus* QUÉL. Ench. Fung. 118, 1886.

Pileus slightly fleshy, regular, margin exceeding the lamellae. Stipe central, cartilaginous. Lamellae adnate or adnexed, usually variegated with the dark spores. Spores black or fuscous-black in mass.

Type species: *Agaricus campanulatus* L. ex FR.

Key to the sections and species in Hokkaido.

I. Pileus without a marginal darker belt; the edge of the pileus overreaching the lamellae, often splitting up into appendiculate denticles .... Sect. Appendiculati.

A. Pileus campanulate or parabolic, tan to clay colored.
   1. Pileus not reticulate, often irregularly cracked and becoming shiny. .... *P. Linnaeanus* (1).
   2. Pileus everywhere minutely reticulate from raised ribs.. *P. retirugis* (2).
B. Pileus campanulate-convex or semiglobose, whitish-pallid, smooth or pellicle cracking into irregular patches........... *P. papilionaceus* (3).

II. Pileus with a more or less distinct marginal belt; no overreaching free edge. .... Sect. Nudi.
A. Pileus fuliginous to nearly black, campanulate......... *P. fimicola* (4).

Sect. Appendiculati LANGE

Agar. Denm. XI, 21, 1936.

Pileus without a marginal darker belt; the edge of the pileus overreaches the lamellae, often splitting up into appendiculate denticles.

1. *Panaeolus Linnaeanus* IMAI, nom. nov.

Agaricus campanulatus L. Sp. Pl. 1175, 1753 (teste FR.).

Agaricus (*Coprinarius*) *papilionaceus* FR. Syst. Myc. I, 301, 1821, p. p.

Agaricus (*Panaeolus*) *campanulatus* (non in 1821) FR. Epicr. Myc. 236, 1838; Hymen. Eur. 311, 1874—BERK. Outl. Brit. Fung. 175, 1860—KICKX, Fl. Crypt. Flandr. II, 179, 1867—CKE. Handb. Brit. Fung. I, 157, 1871; Ill. Brit. Fung. pl. 629, 1888; Handb. Austr. Fung. 67, 1892—WINT. Die Pilze, I, 639, 1884.

Panaeolus campanulatus QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 151, 1872—GILL. Hymen. Fr. 622, cum icone, 1874—SACC. Syll. Fung. V, 1121, 1887; Fl. Ital. Crypt., Hymen. 877, 1916—MASS. Brit. Fung. Fl. I, 336, 1892—W. G. SM. Brit. Basid. 197, 1908—RICKEN, Blätterp. 267, pl. 69, f. 8, 1915—KAUFFM. Agar. Mich. 230, 1918—REA, Brit. Basid. 371, 1922—KONR. et MAUBL. Icon. Sel. Fung. pl. 48, 1929—BRES. Icon. Myc. XVIII, pl. 893, 1931—LANGE, Agar. Denm. XI, 22, 1936.

Chalymmota campanulata KARST. Hattsv. I, 519, 1879—SCHROET. Pilze Schles. I, 566, 1889.

[YASUDA, Bot. Mag. (Tokyo), XXVIII, (476), 1914—SHIRAI, List Jap. Fung. ed. 2, 127, 1917; ed. 3, 77, 1927]

Coprinarius (*Panaeolus*) *campanulatus* QUÉL. Ench. Fung. 118, 1886.

Gregarious or solitary. Pileus 1–4 cm. broad, conico-campanulate, often umbonate, never expanded; surface glabrous, often somewhat silky-shining, rugulose or squamosely-rugose when dry, neither hygrophanous nor viscid, brownish-gray, yellowish-gray or subrufescent, margin somewhat appendiculate or fimbriate because of

the fugacious veil; context grayish, thin, odour and taste none; lamellae adnate, ventricose-ascending, broad, close, variegated gray to black by the spores, white-fimbriate on the edge; stipe 6–10 cm. long, 1–3 mm. thick, equal or slightly enlarged at the base, cylindrical, straight, rigid-fragile, reddish-brown or concolorous, white-pruinose then black-pulverulent, apex striate, hollow; spores black in mass, lemon-shaped, 12–18 × 8–12 μ, smooth; sterile cells on the edge of lamellae cylindric or subclavate, hyaline.

Hab. on dung-hills, manured ground, etc. in pastures or fields. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America, Australia.

Jap. name. *Hikage-take* (YASUDA).

2. *Panaeolus retirugis* (FR.) GILL.

Hymen. Fr. 621, *cum icone*, 1874—SACC. Syll. Fung. V, 1120, 1887—MASS. Brit. Fung. Fl. I, 334, 1892—ATKINS. Mushrooms, ed. 2, 45, f. 45–48, 1903—W. G. SM. Brit. Basid. 197, 1908—MURRILL, Mycologia, III, 100, pl. 40, f. 1, 1911—RICKEN, Blätterp. 268, pl. 69, f. 6, 1915—KAWAMURA, Ill. Jap. Fung. pl. 16, f. 6–8, 1915—KAUFFM. Agar. Mich. 229, 1918—REA, Brit. Basid. 370, 1922—BRES. Icon. Myc. XVIII, pl. 892, 1931—LANGE, Agar. Denm. XI, 22, 1936.

[SHIRAI, List Jap. Fung. ed. 3, 243, 1927]

Agaricus carbonarius BATSCH, Elench. Cont. I, 107, pl. 18, f. 91, 1786 (teste FR.).

Agaricus (Panaeolus) retirugis FR. Epicr. Myc. 235, 1838; Hymen. Eur. 310, 1874—BERK. Outl. Brit. Fung. 175, 1860—CKE. Handb. Brit. Fung. I, 156, 1871; Ill. Brit. Fung. pl. 627, 1888; Handb. Austr. Fung. 66, 1892—WINT. Die Pilze, I, 639, 1884.

Coprinarius (Panaeolus) campanulatus var. *retirugis* QUÉL. Ench. Fung. 119, 1886.

Panaeolus carbonarius SACC. Fl. Ital. Crypt., Hymen. 875, 1916.

Solitary or gregarious. Pileus 1–3 cm. broad, ovate or subglobose, then campanulate-hemispherical, often subumbonate, obtuse; surface flesh-tan-color or dark smoky when young and wet, becoming paler, or in dry weather grayish, pale clay color or creamy-white, usually reticulate-veined on the disc, sometimes even, atomate, opaque; margin connected with stipe in young stage by a floccose-submembranous ring-like veil, veil soon broken and margin markedly denticulato-appendiculate in expanded pileus; context thin, pallid, odour and taste none; lamellae adnato-ascending, broad, ventricose,

close, white then variegate-spotted with the black spores, white-floccose on edge; stipe 5–15 cm. long, 2–6 mm. thick, equal, cylindrical, sometimes flexuous, whitish, rufescent or tinged with purplish within or without, dark below, often pruinose, hollow; spores black in mass, nearly lemon-shaped, smooth, apiculate on the ends, 12–16 × 8–10 μ; sterile cells on edge of lamellae subcylindrical or subclavate, hyaline.

Hab. on dung-hills, manured lawns, fields, roadsides, etc. Summer to autumn. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido, Honshu), China, Europe, North America, Australia.

Jap. name. *Saigyo-gasa* (KAWAMURA).

3. *Panaeolus papilionaceus* (BULL. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 152, 1872 —GILL. Hymen. Fr. 622, 1874—SACC. Syll. Fung. V, 1122, 1887; Fl. Ital. Crypt., Hymen. 876, 1916—MASS. Brit. Fung. Fl. I, 335, 1892—W. G. SM. Brit. Basid. 197, 1908—RICKEN, Blätterp. 267, pl. 69, f. 3, 1915—KAUFFM. Agar. Mich. 231, 1918—REA, Brit. Basid. 371, 1922—KONR. & MAUBL. Icon. Sel. Fung. pl. 49, 1929 —LANGE, Agar. Denm. XI, 22, 1936.

Agaricus papilionaceus BULL. Champ. Fr. pl. 561, f. 2, M, N, 1791 (teste FR.).

Agaricus (Coprinarius) papilionaceus FR. Syst. Myc. I, 301, 1821, p.p.—BERK. in SMITH, Engl. Fl. V, (2), 116, 1836—RABENH. Deut. Krypt. Fl. I, 460, 1844.

Agaricus (Panaeolus) papilionaceus FR. Epicr. Myc. 236, 1838; Hymen. Eur. 311, 1874—BERK. Outl. Brit. Fung. 175, 1860—KICKX, Fl. Crypt. Flandr. II, 179, 1867—CKE. Handb. Brit. Fung. I, 157, 1871; Ill. Brit. Fung. pl. 630, 1888; Handb. Austr. Fung. 67, 1892—WINT. Die Pilze, I, 639, 1884.

Chalymmota papilionacea KARST. Hattsv. I, 519, 1879—SCHROET. Pilze Schles. I, 567, 1889.

[P. HENN. in ENGLERS Bot. Jahrb. XXXII, 40, 1903—MATSUM. Ind. Pl. Jap. I, 134, 1904—SHIRAI, List Jap. Fung. 19, 1905; ed. 2, 127, 1917; ed. 3, 77, 1927]

Coprinarius (Panaeolus) papilionaceus QUÉL. Ench. Fung. 119, 1886.

?*Copelandia papilionacea* BRES. Hedw. LIII, 51, 1913; Icon. Myc. XVIII, pl. 897, 1931.

Solitary or gregarious, said to be poisonous. Pileus 1.5–4 cm. broad, hemispherical, then expanded; surface glabrous, rimoso-squamose or areolate when dry, never viscid nor hygrophanous, pallid or pale-gray to smoke gray, reddish or yellowish at the disc, margin with evanescent pallid veil; context grayish, odour and taste

none; lamellae broadly adnate, often very broad, ventricose, crowded or subdistant, variegated gray-blackish from the spores, at length black, white-fimbriate on the edge; stipe 4–8 cm. long, 2–5 mm. thick, equal, cylindrical, whitish or concolorous, brownish at the base, white powdery above, cartilaginous-toughish, rigid, hollow; spores black in mass, lemon-shaped, smooth, 11–16 × 8–11 μ.

Hab. on dung-hills, manured fields, or in woods. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Siberia, Europe, North America, Australia.

Jap. name. *Warai-take* (KAWAMURA).

Sect. *Nudi* LANGE

Agar. Denm. XI, 21, 1936.

Pileus with a more or less distinct marginal belt; no over-reaching free edge.

4. *Panaeolus fimicola* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 257, 1872 —GILL. Hymen. Fr. 621, cum icone, 1874—KARST. Hattsv. I, 520, 1879—SACC. Syll. Fung. V, 1124, 1887—MASS. Brit. Fung. Fl. I, 338, 1892—W. G. SM. Brit. Basid. 198, 1908—RICKEN, Blätterp. 269, pl. 69, f. 2, 1915—REA, Brit. Basid. 372, 1922—LANGE, Agar. Denm. XI, 23, 1936.

[KAWAMURA, Jap. Fung. no. 119, 1929—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 114, 1931]

Agaricus varius BOLT. Fung. Halif. 66, pl. 66, f. 1, 1788 (teste FR.).

?*Agaricus* (*Coprinus*) *fimicola* PERS. Syn. Fung. 412, 1801.

Agaricus (*Coprinarius*) *fimicola* FR. Syst. Myc. I, 301, 1821—RABENH. Deut. Krypt. Fl. I, 459, 1844.

Agaricus (*Panaeolus*) *fimicola* FR. Epicr. Myc. 237, 1838; Hymen. Eur. 312, 1874—BERK. Outl. Brit. Fung. 175, 1860—KICKX, Fl. Crypt. Flandr. II, 180, 1867—CKE. Handb. Brit. Fung. I, 158, 1871; Ill. Brit. Fung. pl. 632, f. B, 1888; Handb. Austr. Fung. 67, 1892—WINT. Die Pilze, I, 638, 1884.

Coprinarius (*Panaeolus*) *fimicola* QUÉL. Ench. Fung. 119, 1886.

Panaeolus varius SACC. Fl. Ital. Crypt., Hymen. 879, 1916.

Solitary or gregarious. Pileus 1–2 cm. broad, campanulate, then convex, obtuse; surface smooth, fuliginous-gray, clay hoary when dry, opaque, marked around the margin with a narrow fuscous zone, and inside this with a white one; context thin, grayish, taste and odour none; lamellae adnate, slightly rounded, somewhat ventricose,

broad, almost semi-ovate, variegated gray and fuliginous, white fimbriate on edge; stipe 5–10 cm. long, 1–3 mm. thick, equal, dingy pale, obsoletely slightly silky striate, white pruinose at the apex, hollow; spores black in mass, 10–12 × 7–8 μ, ellipsoidal, smooth.

Hab. on horse-dung, manured ground, etc. in pastures, fields, gardens or in woods. Summer to autumn. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Australia.

Jap. name. *Maguso-take* (KAWAMURA).

Psathyra (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 63 & 148, 1872.

Agaricus § *Psathyra* FR. Syst. Myc. I, 295, 1821, p. p.

Pileus fleshy or submembranous, regular, margin straight, at first adpressed to the stipe. Stipe central, cartilaginous. Lamellae adnate, adnexed or free. Spores fuscous-purple or cinereous-purple in mass.

Type species: *Agaricus fibrillosus* PERS. ex FR.

Key to the species in Hokkaido.

1. Fructification densely caespitose........................ *P. multissima* (1).
2. Fructification solitary or gregarious...................... *P. microspora* (2).

Sect. Obtusatae FR.

Epicr. Myc. 232, 1838.

Pileus campanulate-convex, then expanded, glabrous or atomate. Lamellae plano- or arcuato-adnexed. Veil none.

1. *Psathyra multissima* IMAI, sp. nov.

Dense caespitosa. Pileo 2–5 cm. lato, 1.5–3 cm. alto, conico, dein conico-campanulato, hygrophano, udo umbrino, exsiccate ochroleuco, ruguloso, margine velati figacissimi albique; carne tenui, concolora; lamellis adnatis, 3–5 mm. latis, confertis, demum fuscopurpureis, acie albo-fimbriatis; stipite 10–17 cm. longo, 2–4 mm.

crasso, subaequali, rigide-fragili, flexuoso, nonnumquam contorto, albo-nitente, pallescente, surum glabro, deorsum albo-tomentoso; sporis in cumulo fusco-purpureis, ellipsoideis, levibus, 7–9 × 3.5–5 μ; cystidiis nullis; cellulis sterilibus aciae lamellae cystidiiformibus, subfusiformibus apice obtusis, nonnumquam projectiis, hyalinis.

Hab. on decayed wood in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Senbon-kuzutake* (n. n.).

The present fungus somewhat resembles *P. stipatissima* LANGE, and *P. microsperma* PK. from which it is distinguishable by the larger pileus and spores, as well as by the rugulose nature of the pileus when dried.

2. *Psathyra microspora* IMAI, sp. nov.

Solitaria vel gregaria, non dense caespitosa. Pileo 1–2 cm. lato, conico, dein campanulato, non convexo, glabro, ruguloso, hygrophano, udo "Saccardo's umber", exsiccate margine "cartridge-buff", disco "warm-buff", udo striatulato, exsiccate atomato et subnitente; carne concolora, tenui; lamellis adnexis, confertis, "verona-brown", acie non albo-fimbriatis; stipite 2–3.5 cm. longo, 1.5–2 mm. crasso, aequali vel deorsum leviter incrassato, albido, flavescente, nitente, glabro, basi albo-tomentoso, cavo; sporis in cumulo fusco-purpureis, ellipsoideis, utrimque obtusis, levibus, 5–6.5 × 3–4 μ; cystidiis nullis.

Hab. on decayed wood in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic.

Jap. name. *Kotsubu-kuzutake* (n. n.).

The present fungus is related to *P. obtusata* (FR.) GILL. from which it is distinguishable by the minor spores and the pileus not becoming convex even when matured.

Psathyrella (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 63 & 152, 1872.

Agaricus § *Psathyrella* FR. Epicr. Myc. 237, 1838.

Coprinarius § *Psathyrella* QUÉL. Ench. Fung. 119, 1886.

Pileus fleshy or submembranous, regular, margin straight, at first adpressed to the stipe. Stipe central, confluent with the pileus. Lamellae adnate or free. Spores black or fuscous-black in mass.

Type species: *Agaricus disseminatus* PERS. ex FR.

Key to the species in Hokkaido.

1. Stipe 2–4 cm. long; densely gregarious or caespitose; pileus white or gray, furfuraceous.. *P. disseminata* (1).
2. Stipe 4–6 cm. long, gregarious; pileus grayish or reddish, becoming pale-fleshy-color, atomate.................................. *P. atomata* (2).

Sect. **Pruinatipedes** IMAI, nom. nov.

Stipes flexuosus, apice pruinatus.

1. *Psathyrella disseminata* (PERS. ex FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 153, pl. 8, f. 5, 1872—GILL. Hymen. Fr. 618, cum icone, 1874—KARST. Hattsv. I, 524, 1879—SACC. Syll. Fung. V, 1134, 1887—MASS. Brit. Fung. Fl. I, 345, 1892—ATKINS. Mushrooms, ed. 2, 48, f. 49, 1903—W. G. SM. Brit. Basid. 201, 1908—KAUFFM. Agar. Mich. 227, 1918—REA, Brit. Basid. 422, 1922—BRES. Icon. Myc. XVIII, pl. 889, f. 2, 1931.

[KAWAMURA, Jap. Fung. no. 135, 1929—SAWADA, Descr. Cat. Formosan Fung. V, 81, 1931—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 115, 1931]

Agaricus minutulus SCHAEFF. Fung. Bavar. IV, Ind. 72, pl. 308, 1774 (teste FR.).

Agaricus disseminatus PERS. Syn. Fung. 403, 1801 (teste FR.).

Agaricus (*Coprinarius*) *disseminatus* FR. Syst. Myc. I, 305, 1821—BERK. in SMITH, Engl. Fl. V, (2), 118, 1836—RABENH. Deut. Krypt. Fl. I, 458, 1844.

Agaricus (*Psathyrella*) *disseminatus* FR. Epicr. Myc. 240, 1838; Hymen. Eur. 316, 1874—BERK. Outl. Brit. Fung. 176, 1860—KICKX, Fl. Crypt. Flandr. II, 180, 1867—CKE. Handb. Brit. Fung. I, 160, 1871; Ill. Brit. Fung. pl. 657, f. B, 1888; Handb. Austr. Fung. 68, 1892—WINT. Die Pilze, I, 635, 1884.

Coprinarius (*Psathyrella*) *disseminatus* QUÉL. Ench. Fung. 120, 1886.

Coprinus disseminatus RICKEN, Blätterp. 67, pl. 23, f. 4, 1915.

Psathyrella minutula SACC. Fl. Ital. Crypt., Hymen. 868, 1916.

Caespitose or densely gregarious. Pileus 5–20 mm. broad, ovate, then campanulate; surface whitish or yellowish at first, then gray or grayish-brown, prominently sulcate-plicate to the small buff umbo, at first covered with microscopic, erect, one-celled hairs, scurfy,

glabrescent; context very thin, membranous; lamellae adnate, ascending, rather broad, ventricose, subdistant or subcrowded, at first white, then ashy, and finally uniformly black; stipe 2–4 cm. long, 1–2 mm. thick, equal or slightly attenuated upward, cylindrical-filiform, fistulose, subflexuous, white, pellucid, at first minutely hairly with spreading hairs, glabrescent, strigose at the base; spores purplish-black in mass, ellipsoidal, smooth, 6–8 × 3.75–5 μ.

Hab. on rotten wood, in gardens, pastures, woods, etc. Summer to autumn. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido, Honshu, Taiwan), Asia Minor, Europe, North America, Australia.

Jap. name. *Inusembontake* (KAWAMURA).

2. *Psathyrella atomata* (FR.) QUÉL.

Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 153, 1872 —GILL. Hymen. Fr. 617, 1874—KARST. Hattsv. I, 524, 1879—SACC. Syll. Fung. V, 1132, 1887; Fl. Ital. Crypt., Hymen. 869, 1916—MASS. Brit. Fung. Fl. I, 344, 1892—W. G. SM. Brit. Basid. 200, 1908—RICKEN, Blätterp. 265, pl. 68, f. 5, 1915 REA, Brit. Basid. 421, 1922—BRES. Icon. Myc. XVIII, pl. 889, f. 1, 1931.

Agaricus (Psathyra) atomatus FR. Syst. Myc. I, 298, 1821.

Agaricus (Psathyrella) atomatus FR. Epicr. Myc. 239, 1838; Hymen. Eur. 315, 1874—BERK. Outl. Brit. Fung. 176, 1860—CKE. Handb. Brit. Fung. I, 159, 1871; Ill. Brit. Fung. pl. 638, 1888—WINT. Die Pilze, I, 636, 1884.

Coprinarius (Psathyrella) atomata QUÉL. Ench. Fung. 120, 1886.

Psathyra (Psathyrella) atomata LANGE, Agar. Denm. XI, 17, 1936.

Gregarious. Pileus 1–3 cm. broad, campanulate or convex-campanulate, obtuse; surface hygrophanous, slightly viscid, pellucid-striate when wet, slightly wrinkled and without striae when dry, besprinkled with shining atoms, reddish or grayish, becoming pale tan or pale flesh color when dry; context thin, subconcolorous, fragile, odour and taste none; lamellae adnate, subdistant, rather broad, ventricose, whitish, then cinereous-blackish, edge at first white, then concolorous; stipe 4–6 cm. long, 1–3 mm. thick, equal, cylindrical-filiform, fistulose, slender, fragile, often flexuous, whitish or grayish, adpressed-fibrillose, white furfuraceous at the apex; spores black in mass, ellipsoidal, smooth, 11–13 × 6–8 μ.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Kirara-inusenbontake* (n. n.).

Coprinus PERS. ex FR.

Syst. Orb. Veg. I, 75, 1825; Epicr. Myc. 241, 1838.
Coprinus PERS. Tent. Disp. Fung. 62, 1797 (sec. EARLE).
Agaricus § *Coprinus* PERS. Syn. Fung. 395, 1801.
Agaricus § *Coprinus* FR. Syst. Myc. I, 306, 1821.
Onchopus KARST. Hattsv. I, xxviii, 1879.
Pselliophora KARST. Ibid. I, xxviii, 1879.
Coprinellus KARST. Ibid. I, xxviii, 1879.
Coprinopsis KARST. Acta Soc. Faun. Fl. Fenn. II, 26, 1881.

Fructification with or without an annulus or volva. Pileus fleshy, or membranous, regular. Stipe central, confluent or distinct from the pileus. Lamellae free, adnate or attached to a collar, very thin, parallel-sided or subparallel-sided and auto-digested from below upward. Spores black, violet-black or fuscous-black in mass.

Type species: *Agaricus comatus* MÜLL. ex FR.

Key to the sections, subsections and species in Hokkaido.

I. Pileus covered above with a distinct fleshy or membranous pellicle, therefore the pileus does not split along the lines of the lamellae, but become lacerated and revolute.. Sect. Pelliculosi.
  A. Fructification volvato-annulate, pellicle of pileus lacerated into scales.. .... Subsect. Comati.
    1. Pileus large; spores 12–15 μ long................. *C. comatus* (1).
  B. Fructification subannulate, not volvate; pileus dotted or spotted with minute, innate squamules..................... Subsect. Atramentarii.
    1. Pileus large.............................. *C. atramentarius* (2).
  C. Pileus at first covered with minute glistening micaceous squamules or granules which at length disappear; annulus none.... Subsect. Micacei.
    1. Pileus 3–6 cm. broad, yellow-ferruginous; stipe 5–10 cm. long...... .... *C. micaceus* (3).
    2. Pileus 2–3 cm. broad, yellow-tawny; stipe 2–4 cm. long, arising from a dense mass of tawny mycelium................. *C. radians* (4).

II. Pileus very thin, without pellicle, plicate-sulcate, at length splitting along the lines of the lamellae; stipe slender, hollow........... Sect. Veliformes.
  A. Pileus furfuraceous or micaceous; lamellae commonly adnate to the apex of the stipe which is dilated into a ring or collar; stipe ringless... Subsect. Furfurelli.
    1. Apex of the stipe not evidently dilated into a ring or collar.
      a. Usually without sclerotium............... *C. stercorarius* (5).
      b. Springing from sclerotium.................. *C. tuberosus* (6).
    2. Apex of the stipe dilated into a ring or collar; pileus cinnamon-brown....................................... *C. plicatilis* (7).

Sect. Pelliculosi FR.

Epicr. Myc. 242, 1838.

Pileus covered above with a distinct fleshy or membranous pellicle, therefore the pileus does not split along the lines of the lamellae, but becomes lacerated and revolute.

Subsect. Comati FR.

Epicr. Myc. 242, 1838.

Fructification volvato-annulate, pellicle of pileus lacerated into scales.

1. *Coprinus comatus* PERS. ex FR.

Epicr. Myc. 242, 1838; Hymen. Eur. 320, 1874—BERK. Outl. Brit. Fung. 177, 1860—KICKX, Fl. Crypt. Flandr. II, 181, 1867—CKE. Handb. Brit. Fung. I, 161, 1871; Ill. Brit. Fung. pl. 658, 1888; Handb. Austr. Fung. 68, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 154, 1872; Ench. Fung. 121, 1886—GILL. Hymen. Fr. 601, cum icone, 1874—WINT. Die Pilze, I, 633, 1884—SACC. Syll. Fung. V, 1079, 1887—MASS. Brit. Fung. Fl. I, 305, 1892; Ann. Bot. X, 142, 1896—ATKINS. Mushrooms, ed. 2, 33, f. 31–38, 1903—W. G. SM. Brit. Basid. 203, 1908—ROLLAND, Atlas Champ. 73, f. 170, 1910—KAWAMURA, Ill. Jap. Fung. pl. 3, f. 18–22, 1912—RICKEN, Blätterp. 56, pl. 20, f. 1, 1915—LANGE, Agar. Denm. II, 39, 1915—KAUFFM. Agar. Mich. 209, 1918—REA, Brit. Basid. 499, 1922—BRES. Icon. Myc. XVIII, pl. 874, 1931.

[UMEMURA, Bot. Mag. (Tokyo), XXVIII, (358), 1914—SHIRAI, List Jap. Fung. ed. 2, 171, 1917; ed. 3, 100, 1927]

Agaricus porcellaneus SCHAEFF. Fung. Bavar. IV, Ind. 21, pl. 46–47, 1774 (teste FR.).

Agaricus comatus MUELL. Fl. Dan. pl. 834, 1780 (teste FR.).

Coprinus comatus PERS. Tent. Disp. Fung. 62, 1797 (teste FR.).

Agaricus cylindricus SOW. Engl. Fung. pl. 189, 1799 (teste FR.).

Agaricus (Coprinus) comatus PERS. Syn. Fung. 395, 1801 (teste FR.).

Agaricus (Coprinus) comatus FR. Syst. Myc. I, 307, 1821—BERK. in SMITH, Engl. Fl. V, (2), 118, 1836—RABENH. Deut. Krypt. Fl. I, 458, 1844.

Pselliophora comata KARST. Hattsv. I, 528, 1879.

Coprinus porcellanus SCHROET. Pilze Schles. I, 322, 1889—SACC. Fl. Ital. Crypt., Hymen. 898, 1916.

[MATSUM. Ind. Pl. Jap. I, 137, 1904—SHIRAI, List Jap. Fung. 25, 1905; ed. 2, 171, 1917; ed. 3, 101, 1927]

Gregarious, rarely *solitary*, *edible*. Pileus 5–10 cm. high, 3–5 cm. across, cylindrical, then campanulate, at length umbonate or plane and margin revolute; surface white, becoming pinkish from the margin and finally black, pellicle soon broken up into adpressed, shaggy scales, the scales ochraceous at their apices, center whitish to pinkish-buff, smooth or with very fine clay colored scales, finally striate, margin slightly inrolled at first, then straight, at length revolute and often torn into several lobes; context whitish, thin, taste mild; lamellae white, then changing to pink color from the front, at length black and deliquescent, free, 10 mm. wide, edge thick and wrinkled; stipe 15–25 cm. long, 8–15 mm. thick, slightly attenuated upward, silky white, fibrillose, shining, enlarged at the base, rigid, hollow or stuffed with silky wool; annulus white, membranous, movable, narrow, fugacious; spores black in mass, smooth, 12–15 × 6–8 μ.

Hab. on the ground in pastures, gardens, on roadsides, etc. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Australia.

Jap. name. *Sasakure-hitoyotake* (KAWAMURA).

Subsect. **Atramentarii** FR.

Epicr. Myc. 243, 1838.

Fructification subannulate, not volvate. Pileus dotted or spotted with minute, innate squamules.

2. *Coprinus atramentarius* [BULL.] FR.

Epicr. Myc. 243, 1838; Hymen. Eur. 322, 1874—BERK. Outl. Brit. Fung. 177, pl. 12, f. 1, 1860—KICKX, Fl. Crypt. Flandr. II, 182, 1867—CKE. Handb. Brit. Fung. I, 162. 1871; Ill. Brit. Fung. pl. 622, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 155, 1872—GILL. Hymen. Fr. 602, cum icone, 1874—WINT. Die Pilze, I, 632, 1884—SACC. Syll. Fung. V, 1081, 1887; Fl. Ital. Crypt., Hymen. 855, 1916—SCHROET. Pilze Schles. I, 521, 1889—MASS. Brit. Fung. Fl. I, 308, 1892; Ann. Bot. X, 143, 1896—ATKINS. Mushrooms, ed. 2, 40, f. 39–42, 1903—W. G. SM. Brit. Basid. 204, 1908—ROLLAND, Atlas Champ. 73, f. 172, 1910—RICKEN, Blätterp. 62, pl. 22, f. 1, 1915—LANGE, Agar. Denm. II, 39, 1915—KAUFFM. Agar. Mich. 212, 1918—REA, Brit. Basid. 501, 1922—BRES. Icon. Myc. XVIII, pl. 877, 1931.

Agaricus atramentarius BULL. Champ. Fr. pl. 164, 1791 (teste FR.).
Agaricus (*Coprinus*) *atramentarius* FR. Syst. Myc. I, 308, 1821—BERK. in SMITH, Engl. Fl. V, (2), 119, 1836.
Psalliophora atramentaria KARST. Hattsv. I, 529, 1879.
Coprinus fuscescens QUÉL. Ench. Fung. 121, 1886.

Gregarious, sometimes subcaespitose or solitary, edible. Pileus 5–10 cm. broad when expanded, ovate then cylindric to expanded, at length subumbonate; surface grayish, later becoming darker, wholly longitudinally and deeply sulcate and ribbed, silky fibrous or minutely mealy, disc yellowish or brownish and often minutely squamulose, margin slightly incurved at first, finally recurved at the digesting time of lamellae; context grayish, very thin, subfleshy, fragile, taste mild; lamellae free, broad, ventricose, white, then brownish-black, finally deliquescent, flocculose on the edge; stipe 8–18 cm. long, 7.5–15 mm. thick, at first ventricose and fusiform, attenuated upward and shortly downward, white, longitudinally fibrillose, silky shining, smooth on the apex, often with a few tawny squamules at the base; annulus sometimes present near the base of stipe, very fugacious; spores black in mass, ellipsoidal, 9–11 × 5–6 μ, smooth.

Hab. on rich soil, on lawn or elsewhere. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), China, Europe, North America.

Jap. name. *Hitoyo-take* (KAWAMURA).

Subsect. Micacei FR.

Epicr. Myc. 247, 1838.

Pileus at first covered with minute glistening micaceous squamules or granules which at length disappear. Annulus none.

3. *Coprinus micaceus* [BULL.] FR.

Epicr. Myc. 217, 1838; Hymen. Eur. 325, 1874—BERK. Outl. Brit. Fung. 179, 1860—KICKX, Fl. Crypt. Flandr. II, 185, 1867—CKE. Handb. Brit. Fung. I, 165, f. 39, 1871; Ill. Brit. Fung. pl. 673, 1888; Handb. Austr. Fung. 69, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 156, 1872; Ench. Fung. 123, 1886—GILL. Hymen. Fr. 606, cum icone, 1874—KARST. Hattsv. I, 537, 1879—WINT. Die Pilze, I, 629, 1884—SACC. Syll. Fung. V, 1090, 1887; Fl. Ital. Crypt., Hymen. 861, 1916—MASS. Brit. Fung. Fl. I, 317, 1892;

Ann. Bot. X, 166, 1896—ATKINS. Mushrooms, ed. 2, 42, f. 43–44, 1903—W. G. SM. Brit. Basid. 206, 1908—ROLLAND, Atlas Champ. 73, f. 169, 1910—RICKEN, Blätterp. 63, pl. 22, f. 4, 1915—LANGE, Agar. Denm. II, 46, 1915—KAUFFM. Agar. Mich. 218, pl. 39–40, 1918—REA, Brit. Basid. 506, 1922—BRES. Icon. Myc. XVIII, pl. 880, 1931.

[P. HENN. in ENGLERs Bot. Jahrb. XXXIV, (600), 1905—SHIRAI, List Jap. Fung. 25, 1905; ed. 2, 171, 1917; ed. 3, 100, 1927—YASUDA, Bot. Mag. (Tokyo), XXXVII, (204), 1923—UMEMURA, Pl. Fujiyama. 374, 1923]

Agaricus micaceus BULL. Champ. Fr. pl. 246, 1791 (teste FR.).

Agaricus (Coprinus) micaceus FR. Syst. Myc. I, 309, 1821—BERK. in SMITH, Engl. Fl. V, (2), 120, 1836—RABENH. Deut. Krypt. Fl. I, 456, 1844.

Densely caespitose, edible. Pileus 3–6 cm. broad when expanded, ovate, then campanulate; surface yellow-ferruginous, yellow-livid, darker at the disc, at length date-brown-fuscous, ferruginous-ochraceous when dry, undulate-lobate, rimosely split, striate, at first covered with glistening micaceous particles, soon naked and becoming sulcate, even at the disc; margin plicate and irregular; context thin, pallid, taste mild; lamellae adnexed, white or isabelline at first, then brown, or livid at the edge, finally fuscous-black, lanceolate, deliquescent; stipe 5–10 cm. long, 3–8 mm. thick, equal or faintly attenuated upward, white or whitish, silky, often curved, fibrillose, becoming smooth; spores fuscous-black in mass, ellipsoidal, $8–10 \times 4–5\,\mu$.

Hab. on or around the base of stumps or trees or in grassy or denuded places, in woods, pastures or hedgerows. Summer to autumn. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido, Honshu), China, Siberia, Asia Minor, Europe, North America, Australia.

Jap. name. *Kirara-take* (KAWAMURA).

4. *Coprinus radians* (DESM.) FR.

Epicr. Myc. 248, 1838; Hymen. Eur. 326, 1874—BERK. Outl. Brit. Fung. 179, 1860—KICKX, Fl. Crypt. Flandr. II, 186, 1867—CKE. Handb. Brit. Fung. 166, 1871; Ill. Brit. Fung. pl. 676, f. A, 1888—GILL. Hymen. Fr. 607, 1874—QUÉL. Ench. Fung. 123, 1886—SACC. Syll. Fung. V, 1092, 1887; Fl. Ital. Crypt., Hymen. 860, 1916—MASS. Brit. Fung. Fl. I, 319, 1892; Ann. Bot. X, 167, pl. 10, f. 6–8, 1896—W. G. SM. Brit. Basid. 206, 1908—RICKEN, Blätterp. 64, 1915—KAUFFM. Agar. Mich. 219, 1918—REA, Brit. Basid. 507, 1922.

Agaricus radians DESM. Ann. Sci. Nat., Bot. XIII, 214, pl. 10, f. 1, 1828.

Caespitose. Pileus 2–3 cm. broad, ovate, then campanulate and expanded; surface yellow-tawny, becoming pale, micaceous, disc granular, sulcate, margin striate; context white, tawny under the pellicle of the pileus and in the stipe, thin; lamellae adnate, white, then violaceous black, linear, 3–4 mm. wide; stipe 2–4 cm. long, 4–8 mm. thick, slightly attenuated upward from the swollen base, and arising from a dense mass of tawny mycelium, white in color; spores black in mass, ellipsoidal-fusiform, 9–10 × 4–5 μ, with a hyaline germpore at each end.

Hab. on stumps, especially of *Ulmus japonica* SARG., or old stacked logs, etc. Summer. Ishikari (Mt. Moiwa, near Sapporo).

Distr. Japan (Hokkaido), China, Europe.

Jap. name. *Ko-kireratake* (n. n.).

Sect. **Veliformes** FR.

Epicr. Myc. 250, 1838.

Pileus very thin, without pellicle, plicate-sulcate, at length splitting along the lines of the lamellae. Stipe slender, hollow.

Subsect. **Furfurelli** FR.

Epicr. Myc. 251, 1838.

Pileus furfuraceous or micaceous. Lamellae commonly adnate to the stipe which is dilated into a ring or collar. Stipe ringless.

5. ***Coprinus stercorarius*** [SCOP.] FR.

Epicr. Myc. 251, 1838; Hymen. Eur. 330, 1874—KICKX, Fl. Crypt. Flandr. II, 187, 1867—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 159, 1872—GILL. Hymen. Fr. 613, 1874—KARST. Hattsv. I, 539, 1879—WINT. Die Pilze, I, 625, 1884—CKE. Ill. Brit. Fung. pl. 685, 1888; Handb. Austr. Fung. 70, 1892—SACC. Syll. Fung. V, 1103, 1887; Fl. Ital. Crypt., Hymen. 853, 1916—MASS. Brit. Fung. Fl. I, 326, 1892; Ann. Bot. X, 167, 1896—W. G. SM. Brit. Basid. 210, 1908—KAUFFM. Agar. Mich. 220, 1918—REA, Brit. Basid. 513, 1922.

Agaricus stercorarius SCOP. Fl. Carn. ed. 2, II, 427, 1772 (teste FR.).

Solitary or gregarious. Pileus 1–3 cm. broad, ovate, then campanulate, at length expanded and rolling up at the margin; surface whitish, pellucid, covered with dense, micaceous, somewhat persistent, shining white meal, striate at the margin; context white, grayish at the disc, very thin; lamellae adnexed, white at first, soon black, deliquescent, attenuated behind, ventricose, 1–3 mm. broad; stipe 4–10 cm. long, 1–3 mm. thick, attenuated upward from the thickened base, shining white, at first pruinose, then smooth, sometimes springing from a dark sclerotium, hollow; spores black in mass, broadly ellipsoidal or subglobose, 8–10 × 5–6 μ.

Hab. on horse-dung or rich soil at roadside, etc. Summer to autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America, Australia.

Jap. name. *Bahun-hitoyotake* (n. n.).

6. *Coprinus tuberosus* QUÉL.

Champ. Jura Vosg. 6 Suppl., in Bull. Soc. Bot. Fr. XXIV, 289, pl. 3, f. 2, 1878; Ench. Fung. 126, 1886—SACC. Syll. Fung. V, 1110, 1887—MASS. Ann. Bot. X, 164, pl. 11, f. 26–30, 1896—REA, Brit. Basid. 513, 1922.

Gregarious or solitary. Pileus 5–10 mm. broad and high, at first globose, then oblong or cylindrical to campanulate, at length expanded to subumbonate; surface at first wholly covered with umber to sooty colored short spiny warts, which then disappear, then becoming whitish and floccose or powdery, but with the warts remaining on the center, margin whitish, floccose and striatulate, often splitting and upturned; context very thin, light smoky; lamellae almost free, white then black, deliquescent, somewhat veined; stipe 2–4 cm. long, about 1.5 mm. thick, attenuated upward, at first covered with spiny umber colored warts which soon disappear, white, shining, smooth and glabrous above, white pruinose or floccose below, but white woolly at the base, springing from small subglobose or compressed subglobose black sclerotium; spores black in mass, oblong-ellipsoidal, 9–10 × 5.5–6.5 μ.

Hab. on decaying vegetable matters or on dung. Late autumn. Ishikari (Sapporo).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Tama-hitoyotake* (n. n.).

7. *Coprinus plicatilis* [CURT.] FR.

Epicr. Myc. 252, 1838; Hymen. Eur. 331, 1874—BERK. Outl. Brit. Fung. 181, 1860—KICKX, Fl. Crypt. Flandr. II, 189, 1867—CKE. Handb. Brit. Fung. I, 169, 1871; Ill. Brit. Fung. pl. 686, f. A, 1888; Handb. Austr. Fung. 70, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 159, 1872; Ench. Fung. 125, 1886—GILL. Hymen. Fr. 612, cum icone, 1874—KARST. Hattsv. I, 541, 1879—WINT. Die Pilze, I, 624, 1884—SACC. Syll. Fung. V, 1108, 1887; Fl. Ital. Crypt., Hymen. 850, 1916—MASS. Brit. Fung. Fl. I, 328, 1892; Ann. Bot. X, 177, pl. 11, f. 23–25, 1896—W. G. SM. Brit. Basid. 210, 1908—RICKEN, Blätterp. 65, pl. 23, f. 2, 1915—LANGE, Agar. Denm. II, 48, 1915—KAUFFM. Agar. Mich. 226, 1918—REA, Brit. Basid. 516, 1922—BRES. Icon. Myc. XVIII, pl. 884, 1931.

[MATSUM. Ind. Pl. Jap. I, 137, 1904—SHIRAI, List Jap. Fung. 25, 1905; ed. 2, 171, 1917; ed. 3, 101, 1927]

Agaricus plicatilis CURT. Fl. Lond. pl. 200, 1777—SOW. Engl. Fung. III, pl. 364, 1803 (teste FR.).

Agaricus pulcher PERS. Tent. Disp. Fung. 63, 1797; Syn. Fung. 404, 1801 (teste FR.).

Agaricus (Coprinus) plicatilis FR. Syst. Myc. I, 312, 1821.

Gregarious or solitary. Pileus 1–3 cm. broad, conical or ovate-cylindrical, then campanulate, soon expanded; surface furrowed and sulcate-plicate, for the most part smooth, disc broad, even and at length depressed, cinnamon-brown or wood-brown, then grayish and with radiating dark brown colored striations, disc darker, then rufescent; context very thin; lamellae remote from the stipe and adnate to a collar formed by the dilated apex of the stipe, gray, at length gray-black, distant; stipe 4–7 cm. long, 1–2 mm. thick, slightly attenuated upward or subequal, smooth, whitish above, brownish below, subvillous at the base, hollow; spores black in mass, broadly ellipsoidal, 10–12.5 × 7.5–9 μ.

Hab. on the ground among grasses at roadsides, under trees or in woods. Ishikari (Sapporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America, Australia.

Jap. name. *Hime-higasa-hitoyo* (nov.).

Subfam. Lactarioideae IMAI, nom. nov.

Asterospori QUÉL. Ench. Fung. 126, 1886.
Russulei SCHROET. Pilze Schles. I, 533, 1889.

Lactarieae P. HENN. in ENGLER & PR. Nat. Pflanzenfam. I, 1**, 213, 1897.
Russulacées KONR. et MAUBL. Icon. Sel. Fung. 26 & 391, 1924.
Russulaceae HEIM, Fungi Iberici, 75, 1934.

Trama vesiculosa, carnosa, fragilis. Sporae in cumulo albae, flavidulae vel ochraceae, globosae vel subglobosae, asperulae.

Key to the genera.

I. Fructification where bruised exuding a milky or colored juice.... *Lactarius.*
II. Fructification not exuding a juice where bruised................. *Russula.*

Lactarius FR.

Genera Hymen. 8, 1836; Epicr. Myc. 333, 1838.

Lactaria PERS. Tent. Disp. Fung. 63, 1797 (sec. EARLE).
Agaricus § *Lactifluus* PERS. Syn. Fung. 429, 1801.
Lactifluus ROUSSEL, Fl. Calvados, ed. 2, 66, 1806 (sec. EARLE).
Agaricus § *Galorrheus* FR. Syst. Myc. I, 61, 1821.
Galorrheus FR. Syst. Orb. Veg. I, 75, 1825.
Lactariella SCHROET. Pilze Schles. I, 544, 1889.
Gloeocybe EARLE, Bull. N. Y. Bot. Gard. V, 409, 1909.

Fructification fleshy, brittle, exuding latex where injured. Pileus regular. Stipe central, rarely excentric, fleshy, brittle. Lamellae adnate or decurrent, subrigid, brittle. Spores white, yellowish or subochraceous in mass, usually rough.

Type species: *Agaricus torminosus* SCHAEFF. ex FR.

Key to the sections, subsections and species in Hokkaido.

I. Lamellae unchangeable, naked, not changing color and not white-pruinose; latex at first white, acrid (not acrid in *L. flavidulus*)...... Sect. Piperites.
  A. Pileus viscid when moist, margin at first involute, tomentose........ .... Subsect. Tricholomoidei.
    1. Latex changing color to sulphur-yellow; pileus yellow-ochre; stipe subconcolorous, with scrobiculate spots....... *L. scrobiculatus* (1).
    2. Latex unchanging in color.
      a. Pileus flesh-color; stipe subconcolorous or paler.............. .... *L. torminosus* (2).
      b. Pileus olive-green or umber; stipe subconcolorous............ .... *L. necator* (3).
    3. Latex changing color to sage-green, taste mild; pileus whitish then buff-yellow; stipe whitish.................. *L. flavidulus* (4).

B. *Pileus viscid when moist, pelliculose, naked at the margin*.......... .... Subsect. Limacini.

1. Pileus cinnamon-buff or rufous, zonate.
   a. Stipe paler than the pileus, stuffed then hollow.............. .... *L. insulsus*(5).
   b. Stipe paler than the pileus, solid............. *L. zonarius*(6).
2. Pileus gray or purplish.
   a. Latex not changing color to dark lilac.
      i. Pileus livid-gray to smoky-gray or with purple tint...... .... *L. trivialis*(7).
      ii. Pileus purplish-sooty.................. *L. akanensis*(8).
   b. Latex changing to dark lilac................... *L. uvidus*(9).

C. Pileus without a pellicle, hence absolutely dry, most frequently unpolished...................................... Subsect. Piperati.

1. Pileus glabrous, white, yellowish or brownish.... *L. piperatus*(10).
2. Pileus minutely tomentose or velvety, white or whitish.......... .... *L. vellereus*(11).

II. Lamellae pallid then discolored, afterwards darker, glancing when turned to the light, at length white pruinose; latex at first white, mild or mild becoming acrid...................................... Sect. Russularia.

A. Pileus at first viscid.............................. Subsect. Viscidi.

1. Latex not changing or scarcely changing color.
   a. Pileus small sized, light chestnut color at the center......... .... *L. avellaneus*(12).
   b. Pileus medium sized.
      i. Pileus avellaneous....................... *L. vietus*(13).
      ii. Pileus cinnamon or reddish cinnamon...... *L. quietus*(14).
2. Latex changing color to sulphur-yellow........ *L. theiogalus*(15).

B. Pileus unpolished, squamulose, villose or pruinose... Subsect. Impoliti.

1. Latex not changing color.
   a. Lamellae crowded.
      i. Pileus ocher-red, minutely floccose-silky, then glabrous... .... *L. rufus*(16).
      ii. Pileus densely covered with small isabelline colored scales. .... *L. helvus*(17).
      iii. Pileus pinkish-buff, velvety; stipe glabrous............ .... *L. griseus*(18).
      iv. Pileus densely covered with olivaceous-black colored minute fibrous scales....................... *L. Sakamotoi*(19).
   b. Lamellae distant; pileus ochraceous-buff.................... .... *L. hygrophoroides*(20).
2. Latex changing color to flesh or salmon-pink.
   a. Pileus dark-brown or sooty, plicately rugose or wrinkled sulcate. .... *L. lignyotus*(21).
   b. Pileus whitish, grayish or avellaneous..... *L. fuliginosus*(22).

3. Latex staining the wounds brown; pileus pinkish-cinnamon.. *L. luteolus*(23).

C. Pileus polished, glabrous........................ Subsect. Glabrati.
1. Pileus large, orange-buff; latex mild, abundant... *L. volemus*(24).
2. Pileus small, reddish fulvous; latex mild or slowly acrid.. *L. subdulcis*(25).

III. Lamellae naked; latex always deeply colored.............. Sect. Dapetes.
A. Latex orange or scarlet.......................... *L. deliciosus*(26).
B. Latex blood-red or dark-red.................... *L. sanguifluus*(27).

Sect. Piperites Fr.

Epicr. Myc. 333, 1838.

Lamellae unchangeable, naked, not changing color and not white-pruinose; latex at first white, acrid (except *L. flavidulus*).

Subsect. Tricholomoidei Fr.

Epicr. Myc. 333, 1838.

Pileus viscid when moist, margin at first involute, tomentose.

1. *Lactarius scrobiculatus* [Scop.] Fr.

Epicr. Myc. 334, 1838; Monogr. Hymen. Suec. II, 152, 1863; Hymen. Eur. 422, 1874—Quél. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 194, 1872; Ench. Fung. 126, 1886—Gill. Hymen. Fr. 206, cum icone, 1874—Karst. Hattsv. I, 178, 1879—Wint. Die Pilze, I, 556, 1884—Sacc. Syll. Fung. V, 424, 1887; Fl. Ital. Crypt., Hymen. 383, 1915—Cke. Ill. Brit. Fung. pl. 971, 1888—Mass. Brit. Fung. Fl. III, 4, 1893—W. G. Sm. Brit. Basid. 268, 1908—Rolland, Atlas Champ. 34, f. 60, 1910—Ricken, Blätterp. 27, pl. 9, f. 2, 1915—Kauffm. Agar. Mich. 90, 1918—Rea, Brit. Basid. 479, 1922—Bres. Icon. Myc. VIII, pl. 356, 1928.

[Imai, Bot. Mag. (Tokyo), XLIX, 603, 1935]

Agaricus scrobiculatus Scop. Fl. Carn. ed. 2, II, 450, 1772 (teste Fr.).

Agaricus (Galorrheus) scrobiculatus Fr. Syst. Myc. I, 62, 1821—Rabenh. Deut. Krypt. Fl. I, 554, 1844—Barla, Champ. Nice, 32, pl. 18, f. 3–6, 1859.

Lactaria scrobiculata Schroët. Pilze Schles. I, 541, 1889—Burlingh. Lactariae U. S. 32, 1908; North Amer. Fl. IX, 179, 1910.

Solitary or gregarious. Pileus 6–15 cm. or more broad, convex-umbilicate, at length infundibuliform; surface yellow-ocher or anti-

mony-yellow, zoned or zoneless, viscid when moist, center at first covered with agglutinated down, then becoming subglabrous, margin at first involute and tomentose, then spreading or upturned and sometimes nearly naked; context somewhat firm, yellowish, taste acrid; latex white, soon changing to sulphur-yellow, acrid; lamellae decurrent or slightly adnate, whitish or pale yellowish, becoming darker when old, crowded, sometimes forking near the stipe, darker where wounded; stipe 4–9 cm. long, 1.5–3.5 cm. thick, equal, subconcolorous or paler, slightly viscid, spotted with brighter colored elliptic or orbicular scrobiculate spots, covered with very short agglutinated down below, subglabrous above, stuffed then hollow; spores white or slightly yellowish in mass, subglobose, or broadly ellipsoidal, minutely echinulate, 8–10 × 7.5–8 μ.

Hab. on the ground in woods, mostly in coniferous regions. Autumn. Kitami (Oketo forest).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America.

Jap. name. *Ki-karahatsudake* (IMAI).

2. *Lactarius torminosus* [SCHAEFF.] FR.

Epicr. Myc. 334, 1838; Monogr. Hymen. Suec. II, 153, 1863; Hymen. Eur. 422, 1874—BERK. Outl. Brit. Fung. 203, 1860—CKE. Handb. Brit. Fung. I, 207, 1871; Ill. Brit. Fung. pl. 972, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 194, 1872; Ench. Fung. 127, 1886—GILL. Hymen. Fr. 211, *cum icone*, 1874—KARST. Hattsv. I, 179, 1879—WINT. Die Pilze, I, 556, 1884—SACC. Syll. Fung. V, 424, 1887; Fl. Ital. Crypt., Hymen. 383, 1915—MASS. Brit. Fung. Fl. III, 5, 1893—ATKINS. Mushrooms, ed. 2, 119, f. 121, 1903—W. G. SM. Brit. Basid. 268, 1908—KAWAMURA, Bot. Mag. (Tokyo), XXIII, (492), 1909; Ibid. XXV, 113, pl. 3, 1911—ROLLAND, Atlas Champ. 34, f. 63, 1910—RICKEN, Blätterp. 27, pl. 9, f. 3, 1915—KAUFFM. Agar. Mich. 91, 1918—REA, Brit. Basid. 479, 1922—BRES. Icon. Myc. VIII, pl. 357, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 603, 1935]

Agaricus torminosus SCHAEFF. Fung. Bavar. IV, Ind. 7, pl. 12, 1774—SOW. Engl. Fung. pl. 103, 1797 (teste FR.).

Agaricus (Galorrheus) torminosus FR. Syst. Myc. I, 63, 1821—BERK. in SMITH, Engl. Fl. V, (2), 24, 1836—RABENH. Deut. Krypt. Fl. I, 553, 1844—BARLA, Champ. Nice, 33, pl. 18, f. 7–10, 1859—CORDA, Champ. Fr. II, 114, pl. 27, f. 1, 1870.

Lactaria torminosa SCHROET. Pilze Schles. I, 539, 1889—BURLINGH. Lactariae U. S. 30, 1908; North Amer. Fl. IX, 178, 1910.

Gregarious or solitary, not poisonous. Pileus 5–13.5 cm. broad, convex, then depressed in the center with incurved margin, finally

nearly infundibuliform with the margin merely deflexed; surface pallid-flesh-color, flesh-color or ochraceous-salmon color, concentric zoned with deeper color, sometimes nearly white and azonate, viscid when wet, tomentose but the center glabrous, margin involute at first, whitish woolly tomentose; context nearly white or orangish, firm; latex white, unchanging, very acrid; lamellae decurrent, whitish, light buff or pale ochraceous-salmon, crowded, some forking near the stipe; stipe 4–8 cm. long, 1–2.5 cm. thick, subequal or attenuated downward, paler than the pileus, sometimes faintly spotted with yellow, glabrous or pruinose, smooth, uneven, somewhat stuffed, soon becoming hollow; spores white in mass, broadly ellipsoidal, echinulate, 8.5–9.5 × 7–8 μ.

Hab. on the ground in woods or under trees. Late summer to autumn. Ishikari (Nopporo, Mt. Teine, Tsukisappu).

Distr. Japan (Hokkaido, Honshu), Siberia, Europe, North America.

Jap. name. *Kara-hatsudake* (KAWAMURA).

3. *Lactarius necator* (PERS. ex FR.) KARST.

Hattsv. I, 179, 1879—SACC. Fl. Ital. Crypt., Hymen. 384, 1915.

Agaricus necator (non BULL.) PERS. Syn. Fung. 435, 1801 (teste FR.).

Agaricus (Galorrheus) necator FR. Syst. Myc. I, 64, 1821.

Agaricus turpis WEINM. Syll. Pl. Nov. II, 85, 1828.

Lactarius turpis FR. Epicr. Myc. 335, 1838; Monogr. Hymen. Suec. II, 154, 1863; Hymen. Eur. 423, 1874—BERK. Outl. Brit. Fung. 203, 1860—CKE. Handb. Brit. Fung. I, 207, 1871; Ill. Brit. Fung. pl. 987, 1888; Handb. Austr. Fung. 77, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 194, 1872—GILL. Hymen. Fr. 209, cum icone, 1874—WINT. Die Pilze, I, 555, 1884—SACC. Syll. Fung. V, 426, 1887—MASS. Brit. Fung. Fl. III, 7, 1893—W. G. SM. Brit. Basid. 269, 1908—RICKEN, Blätterp. 28, pl. 9, f. 4, 1915—KAUFFM. Agar. Mich. 88, 1918—REA, Brit. Basid. 480, 1922—BRES. Icon. Myc. VIII, pl. 358, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 604, 1935]

Lactarius plumbeus QUÉL. Ench. Fung. 127, 1886.

Lactaria necator SCHROET. Pilze Schles. I, 540, 1889.

Lactaria turpis BURLINGH. Lactariae U. S. 44, 1908; North Amer. Fl. IX, 183, 1910.

Gregarious or solitary, said to be edible. Pileus 6–15 cm. broad, convex, then plane, depressed at the center, at length nearly infundibuliform; surface olive-green or umber, darker at the center, azonate, viscid when wet, glabrous and agglutinated-fibrous or somewhat

roughened, margin involute at first and yellow-villose, then glabrous; context white, firm, thick; latex white, unchanging, acrid; lamellae somewhat decurrent, yellowish, then darker yellow, becoming fuscous where bruised, then ash-colored from the spores, many forking near the stipe, crowded, narrow; stipe 3–8 cm. long, 1–2.5 cm. thick, subequal or attenuated at the base, subconcolorous, viscid when wet, glabrous, smooth or somewhat scrobiculate or sometimes merely spotted, spots becoming nearly black in dried specimens, firm, stuffed, becoming hollow; spores white in mass, globose or subglobose, echinulate, 6.5–8.5 μ in diam.

Hab. on the ground in woods. Autumn. Ishikari (Sapporo, Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Siberia, Asia Minor, Europe, North America, Australia.

Jap. name. *Uguisucha-chichitake* (IMAI).

4. *Lactarius flavidulus* IMAI

Bot. Mag. (Tokyo), XLIX, 604, 1935.

Gregarious or solitary, edible. Pileus 6–15 cm. broad, convex, then convex-umbilicate, at length broadly infundibuliform; surface at first whitish, then cream color to buff-yellow, slightly zoned, viscid when moist, subglabrous, somewhat roughened, margin paler, involute and minutely villous when young, then arched and at length upturned and glabrous; context white, thick, rigid; latex white, becoming sage-green on exposure to air, taste mild, odour pleasant; lamellae decurrent or adnate-decurrent, white, then yellowish, tinged with green where bruised after the latex, moderately crowded, attenuated to both ends; stipe 4–6 cm. long, 1.5–3 cm. thick, equal, milky white, then cream-color, slightly velvety at first, then glabrous, hollow; spores white in mass, subglobose or globose, echinulate, $7.5\text{–}10 \times 7\text{–}8.5\ \mu$.

Hab. on the ground in woods. Autumn. Ishikari (Nopporo).

Distr. Endemic (Hokkaido, Honshu).

Jap. name. *Ki-hatsudake* (IMAI).

The species does not strictly belong here because of the mild latex, but the writer tentatively places it in this subsection.

Subsect. Limacini FR.

Epicr. Myc. 336, 1838.

Pileus viscid when moist, pelliculose, naked at the margin.

5. *Lactarius insulsus* FR.

Epicr. Myc. 336, 1838; Monogr. Hymen. Suec. II, 157, 1863; Hymen. Eur. 424, 1874—BERK. Outl. Brit. Fung. 204, pl. 13, f. 2, 1860—KICKX, Fl. Crypt. Flandr. II, 199, 1867—CKE. Handb. Brit. Fung. I, 208, 1871; Ill. Brit. Fung. pl. 975, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D' Emul. Montb. 2 sér. V, 195, 1872—GILL. Hymen. Fr. 213, cum icone, 1874—KARST. Hattsv. I, 181, 1879 —WINT. Die Pilze, I, 554, 1884—SACC. Syll. Fung. V, 427, 1887; Fl. Ital. Crypt., Hymen. 389, 1915—MASS. Brit. Fung. Fl. III, 9, 1893—W. G. SM. Brit. Basid. 270, 1908—RICKEN, Blätterp. 28, 1915—KAUFFM. Agar. Mich. 98, pl. 10, 1918—REA, Brit. Basid. 481, 1922—BRES. Icon. Myc. VIII, pl. 362, 1928—LANGE, Agar. Denm. VII, 30, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 604, 1935]

Agaricus insulsus FR. Syst. Myc. I, 68, 1821—RABENH. Deut. Krypt. Fl. I, 552, 1844.

Lactaria insulsa P. HENN. in ENGLER & PR. Nat. Pflanzenfam. I, 1**, 216, 1898—BURLINGH. Lactariae U. S. 51, 1908; North Amer. Fl. IX, 180, 1910.

Gregarious or solitary, edible. Pileus 4.5–12 cm. broad, convex-umbilicate, then becoming depressed at the center, finally infundibuliform; surface glabrous, viscid when moist, at first vinaceous-tawny or rufous and with deeper colored concentrically ringed zones, then becoming slightly paler, margin at first strongly incurved and with slightly white soft down which at length almost disappears, then often becoming lobate; context white, no odour, taste slightly acrid, not changing in color; latex white, unchanging color, acrid; lamellae decurrent, very distant, whitish at first, becoming light ochraceous-buff, frequently forking near the stipe, rather thick, fragile, 1 cm. broad at the middle portion; stipe 2–5 cm. long, 1.5–2.5 cm. thick, attenuated downward, paler than the pileus, sometimes spotted with deeper color, glabrous or white pruinose, stuffed, then hollow; spores yellow in mass, subglobose, echinulate, $7.5–9 \times 6–7.5\ \mu$.

Hab. on the ground in woods. Late summer to autumn. Ishikari (Sapporo, Mt. Teine, Nopporo).

Distr. Japan (Hokkaido), China, Europe, North America.

Jap. name. *Karahatsu-modoki* (IMAI).

6. *Lactarius zonarius* [BULL.] FR.

Epicr. Myc. 336, 1838; Monogr. Hymen. Suec. II, 158, 1863; Hymen. Eur. 425, 1874—BERK. Outl. Brit. Fung. 204, 1860—CKE. Handb. Brit. Fung. I, 209, 1871—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 196, 1872; Ench. Fung. 127, 1886—GILL. Hymen. Fr. 214, 1874—KARST. Hattsv. I, 182, 1879—WINT. Die Pilze, I, 553, 1884—SACC. Syll. Fung. V, 428, 1887; Fl. Ital. Crypt., Hymen. 388, 1915—MASS. Brit. Fung. Fl. III, 10, 1893—W. G. SM. Brit. Basid. 270, 1908—REA, Brit. Basid. 481, 1922—BRES. Icon. Myc. VIII, pl. 363, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 605, 1935]
Agaricus zonarius BULL. Champ. Fr. pl. 104, 1791 (teste FR.).
Agaricus flexuosus PERS. Syn. Fung. 430, 1801 (teste FR.).
Agaricus (*Galorrheus*) *flexuosus* FR. Syst. Myc. I, 74, 1821, p. p.
Lactaria zonaria SCHROET. Pilze Schles. I, 538, 1889.

Gregarious, edible. Pileus 5–10 cm. broad, convex-umbilicate, at length infundibuliform; surface slightly viscid when moist, warm-buff or cinnamon-buff, with alternate narrow zones of cinnamon and warm-buff color on the marginal zone, glabrous, margin incurved and white-pruinosely tomentose; context whitish, then slightly tinged with yellow; latex white, unchanging, but after some hours slightly stains the lamellae with a brownish tint where bruised, very acrid, abundant; lamellae decurrent, pinkish-buff at first, then becoming slightly darker, very distant, rather thick, about 5–6 mm. broad, almost not forked; stipe 3.5–5 cm. long, 1.5–2 cm. thick, equal, glabrous, white above, paler than the pileus below, solid; spores yellowish in mass, globose or subglobose, echinulate or subreticulate, $8–10 \times 7.5–10\,\mu$.

Hab. on the ground in woods. Autumn. Ishikari (Mt. Teine).
Distr. Japan (Hokkaido), Asia Minor, Europe.
Jap. name. *Ki-karahatsumodoki* (IMAI).

7. *Lactarius trivialis* FR.

Epicr. Myc. 337, 1838; Monogr. Hymen. Suec. II, 160, 1863; Hymen. Eur. 426, 1874—CKE. Handb. Brit. Fung. I, 210, 1871; Ill. Brit. Fung. pl. 976, 1888—QUÉL. Champ. Jura Vosg. 2 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 354, 1873; Ench. Fung. 128, 1886—GILL. Hymen. Fr. 214, 1874—KARST. Hattsv. I, 184, 1879—WINT. Die Pilze, I, 552, 1884—SACC. Syll. Fung. V, 430, 1887; Fl. Ital. Crypt., Hymen. 390, 1915—MASS. Brit. Fung. Fl. III, 11, 1893—W. G. SM. Brit. Basid. 270, 1908—RICKEN, Blätterp. 33, 1915—KAUFFM. Agar.

Mich. 100, 1918—REA, Brit. Basid. 483, 1922—BRES. Icon. Myc. VIII, pl. 366, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 605, 1935]

Agaricus (*Galorrheus*) *trivialis* FR. Syst. Myc. I, 65, 1821—RABENH. Deut. Krypt. Fl. I, 552, 1844.

Lactaria trivialis SCHROET Pilze Schles. I, 538, 1889—BURLINGH. Lactariae U. S. 53, 1908; North Amer. Fl. IX, 181, 1910.

Gregarious or solitary, edible. Pileus 5–15 cm. broad, convex, then subumbilicate to subinfundibuliform; surface azonate, viscid, glabrous, variable in color: livid-gray to smoky-gray or with a lilac-purplish tint, lead-color or pinkish-brown, margin soon arched, at first pruinose, thin; context white, thick, rigid-fragile; latex white or creamy-white, unchanging or sometimes faintly yellowish, acrid; lamellae slightly decurrent, whitish or creamy to yellowish, crowded, thin, some forked; stipe 3–12 cm. long, 1–2 cm. thick, nearly equal but often inflated at the base, concolorous or paler, not spotted, glabrous, viscid, smooth, stuffed then hollow; spores subochraceous in mass, subglobose or broadly ellipsoidal, echinulate, 8–10 × 7–9 μ.

Hab. on the ground in woods. Autumn. Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Kihada-chichitake* (IMAI).

8. *Lactarius akanensis* IMAI

Bot. Mag. (Tokyo), XLIX, 605, 1935.

Gregarious. Pileus 4–10 cm. broad, convex at first, then depressed to convex-umbilicate; surface glutinous, glabrous, smooth, pale purplish-sooty, a few times and slightly zoned with darker lines when young, later usually azonate, margin incurved, naked; context white, thick; latex white, becoming greenish-yellowish or dusky-viridescent when dried on the lamellae, at first mild, then subacrid, conspicuous; lamellae adnate with a slightly decurrent tooth, whitish or faintly tinged with yellowish color, rather distant, rarely forked near the stipe; stipe 2–5 cm. long, 1–1.5 cm. thick, usually slightly attenuated downward, white or whitish, slightly viscid when moist, polished when dry, solid then hollow; spores white in mass, broadly ellipsoidal or subglobose, echinulate, 8–10 × 6–8 μ.

Hab. on the ground in woods. Autumn. Kushiro (Lake side of Akan).

Distr. Endemic.

Jap. name. *Umenezu-chichitake* (IMAI).

9. *Lactarius uvidus* FR.

Epicr. Myc. 338, 1838; Monogr. Hymen. Suec. II, 162, 1863; Hymen. Eur. 426, 1874—BERK. Outl. Brit. Fung. 205, 1860—CKE. Handb. Brit. Fung. I, 210, 1871—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 196, 1872; Ench. Fung. 128, 1886—GILL. Hymen. Fr. 202, cum icone, 1874—KARST. Hattsv. I, 185, 1879—WINT. Die Pilze, I, 552, 1884—SACC. Syll. Fung. V, 431, 1887; Fl. Ital. Crypt., Hymen. 385, 1915—MASS. Brit. Fung. Fl. III, 12, 1893—W. G. SM. Brit. Basid. 271, 1908—RICKEN, Blätterp. 32, pl. 11, f. 4, 1915—KAUFFM. Agar. Mich. 101, 1918—REA, Brit. Basid. 483, 1922—BRES. Icon. Myc. VIII, pl. 367, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 606, 1935]

Agaricus lividorubescens BATSCH, Elench. Fung. Cont. II, 51, 1789 (teste FR.).

Agaricus (*Galorrheus*) *uvidus* FR. Syst. Myc. 1, 66, 1821.

Lactaria uvida SCHROET. Pilze Schles. I, 543, 1889.

Lactaria lividorubescens BURLINGH. Lactariae U. S. 49, 1908; North Amer. Fl. IX, 184, 1910.

Gregarious or solitary, said by BRESADOLA to be edible. Pileus 4–9 cm. broad, convex, then plane to depressed, at length nearly infundibuliform; surface variable in color, cinereous to light chestnut color, concentric zoned especially when young, or spotted, zones becoming inconspicuous when old, viscid when moist, glabrous, margin involute and minutely downy at first, then becoming straight to upturned and striatulate; context whitish, changing after the latex to lilac or dark lilac where wounded, rigid, firm, rather thin; latex white, changing to dark lilac or chocolate color where in contact with the flesh, bitterish-acrid, disagreeable; lamellae adnate or decurrent, white to yellowish, changing to lilac or dark lilac after the latex, forking next the stipe, crowded, narrow; stipe 3–8 cm. long, 1–1.5 cm. thick, equal or attenuated at the base, whitish, becoming yellowish, viscid, glabrous, sometimes tomentose at the base, stuffed, then hollow; spores white or tinged somewhat yellowish, subellipsoidal, echinulate, 8.5–11 × 7–8.5 μ.

Hab. on the ground in woods. Late summer to autumn. Ishikari (Nopporo), Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Tobicha-chichitake* (IMAI).

Subsect. Piperati FR.

Epicr. Myc. 338, 1838.

Pileus without a pellicle, hence absolutely dry, most frequently unpolished.

10. *Lactarius piperatus* [SCOP.] FR.

Epicr. Myc. 340, 1838; Monogr. Hymen. Suec. II, 166, 1863; Hymen. Eur. 430, 1874—BERK. Outl. Brit. Fung. 205, 1860—KICKX, Fl. Crypt. Flandr. II, 200, 1867—CKE. Handb. Brit. Fung. I, 212, 1871; Ill. Brit. Fung. pl. 979, 1888; Handb. Austr. Fung. 77, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 198, 1872; Ench. Fung. 128, 1886—GILL. Hymen. Fr. 215, 1874—KARST. Hattsv. I, 187, 1879—WINT. Die Pilze, I, 548, 1884—SACC. Syll. Fung. V, 436, 1887; Fl. Ital. Crypt., Hymen. 378, 1915—MASS. Brit. Fung. Fl. III, 17, 1893—ATKINS. Mushrooms, ed. 2, 120, f. 122, 1903—W. G. SM. Brit. Basid. 273, 1908—KAWAMURA, Bot. Mag. (Tokyo), XXII, (411), 1 fig., 1908; Ill. Jap. Fung. pl. 19, f. 1–4, 1925—ROLLAND, Atlas Champ. 35, f. 66, 1910—RICKEN, Blätterp. 29, pl. 10, f. 3, 1915—KAUFFM. Agar. Mich. 95, pl. 9, 1918—REA, Brit. Basid. 486, 1922—BRES. Icon. Myc. VIII, pl. 371, 1928.

[SHIRAI, List Jap. Fung. 45, 1905; ed. 2, 309, 1917; ed. 3, 180, 1927—UMEMURA, Pl. Fujiyama. 368, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 113, 1931—IMAI, Bot. Mag. (Tokyo), XLIX, 606, 1935]

Agaricus piperatus SCOP. Fl. Carn. ed. 2, II, 449, 1772 (teste FR.).

Agaricus (*Galorrheus*) *piperatus* FR. Syst. Myc. I, 76, 1821—BERK. in SMITH, Engl. Fl. V, (2), 30, 1836—RABENH. Deut. Krypt. Fl. I, 550, 1844—BARLA, Champ. Nice, 42, pl. 22, f. 1–5, 1859—CORDA, Champ. Fr. II, 111, pl. 18, f. 1, 1870.

Lactaria piperata SCHROET. Pilze Schles. I, 536, 1889—BURLINGH. Lactariae U. S. 18, 1908; North Amer. Fl. IX, 176, 1910.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 149, 1904]

Gregarious or solitary, edible. Pileus 3.5–22 cm. broad, convex-umbilicate, then expanded and depressed at the center, at length infundibuliform; surface white, then mixed with yellowish or brownish

colors, azonate, dry, glabrous, even or wrinkled, margin involute at first and naked, at length spreading or elevated; context white, compact, thick, becoming yellowish when cut and exposed to the air; latex white, unchanging or rarely creamy or greenish when dry, very acrid, abundant; lamellae decurrent or slightly adnate, white or creamy white, or pale ochraceous, at length becoming brown, narrow, very crowded, 1–3 mm. wide, dichotomously forked, edge obtuse; stipe 3–9 cm. long, 1–5 cm. thick, equal, often attenuated downward or subconical, milky white, glabrous or pruinose, dry, firm, solid; spores white in mass, subglabrous or broadly ellipsoidal, echinulate, $7–9 \times 6–7.5\,\mu$.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), China, Siberia, Europe, North America, Australia.

Jap. name. *Tsuchikamuri* (KAWAMURA).

Forma *pergamenus* (SWARTZ ex FR.) IMAI, comb. nov.

Agaricus pergamenus SWARTZ, Sv. Vet.-Akad. Nya Handl. XXX, 90, 1809 (teste FR.).

Agaricus (*Galorrheus*) *pergamenus* FR. Syst. Myc. I, 76, 1821—RABENH. Deut. Krypt. Fl. I, 551, 1844.

Lactarius pergamenus FR. Epicr. Myc. 340, 1838; Monogr. Hymen. Suec. II, 166, 1863; Hymen. Eur. 430, 1874—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. *D'Emul. Montb. 2 sér. V, 198, 1872—GILL. Hymen. Fr. 216, cum icone, 1874*—KARST. Hattsv. I, 187, 1879—WINT. Die Pilze, I, 549, 1884—SACC. Syll. Fung. V, 436, 1887; Fl. Ital. Crypt., Hymen. 377, 1915—CKE. Ill. Brit. Fung. pl. 978, 1888—MASS. Brit. Fung. Fl. III, 16, 1893—W. G. SM. Brit. Basid. 273, 1908.

Lactaria pergamena SCHROET. Pilze Schles. I, 537, 1889—BURLINGH. Lactariae U. S. 21, 1908; North Amer. Fl. IX, 176, 1910.

[YASUDA, Bot. Mag. (Tokyo), XXXVI, (103), 1922]

Lactarius piperatus var. *pergamenus* REA, Brit. Basid. 486, 1922.

Differs from the type in that the pileus is rugose wrinkled, the stipe long and slender and the lamellae adnate and horizontal.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu, Chosen), Siberia, Europe, North America.

Jap. name. *Kawa-chichitake* (YASUDA).

11. *Lactarius vellereus* FR.

Epicr. Myc. 340, 1838; Monogr. Hymen. Suec. II, 167, 1863; Hymen. Eur. 430, 1874—BERK. Outl. Brit. Fung. 206, 1860—KICKX, Fl. Crypt. Flandr. II, 201, 1867—CKE. Handb. Brit. Fung. I, 212, 1871; Ill. Brit. Fung. pl. 980, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 198, 1872; Ench. Fung. 128, 1886—GILL. Hymen. Fr. 215, cum icone, 1874—KARST. Hattsv. I, 188, 1879—WINT. Die Pilze, I, 548, 1884—SACC. Syll. Fung. V, 437, 1887—MASS. Brit. Fung. Fl. III, 18, 1893—W. G. SM. Brit. Basid. 273, 1908—RICKEN, Blätterp. 29, pl. 10, f. 2, 1915—KAUFFM. Agar. Mich. 92, 1918—REA, Brit. Basid. 486, 1922—BRES. Icon. Myc. VIII, 372, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 606, 1935]

Agaricus Listeri SOW. Engl. Fung. pl. 104, 1797 (teste FR.).

Agaricus (*Galorrheus*) *vellereus* FR. Syst. Myc. I, 76, 1821—BERK. in SMITH, Engl. Fl. V, (2), 31, 1836—RABENH. Deut. Krypt. Fl. I, 550, 1844—BARLA, Champ. Nice, 43, pl. 22, f. 6–8, 1859—CORDA, Champ. Fr. II, 115, pl. 28, f. 2, 1870.

Lactaria vellerea SCHROET. Pilze Schles. I, 538, 1889—BURLINGH. Lactariae U. S. 22, 1908; North Amer. Fl. IX, 177, 1910.

[YASUDA, Bot. Mag. (Tokyo), XXXVIII, (47), 1924]

Lactarius Listeri SACC. Fl. Ital. Crypt., Hymen. 377, 1915.

Solitary or gregarious, edible. Pileus 6–12 cm. or more broad, convex-umbilicate with strongly inrolled then expanded margin, at length infundibuliform; surface white or whitish, tinged with grayish or yellowish in places, dry, minutely tomentose or velvety; context white at first, yellowish on exposure to air after the latex; latex white, becoming cream color when dry, acrid; lamellae adnate-decurrent, whitish, then yellowish, changing to brownish where injured, distant, rather broad, rather thick; stipe 3–6 cm. long, 2–4 cm. thick, equal, white or whitish, becoming yellowish or brownish, pruinose-velvety, solid; spores white in mass, subglobose or broadly ellipsoidal, nearly smooth, $7.5–9 \times 6.25–7.5\ \mu$; cystidia cylindrical, with blunt or short acute tip, not smooth.

Hab. on the ground in woods. Summer to autumn. Ishikari (Mt. Teine, Mt. Kurodake).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Ke-shirohatsudake* (YASUDA).

Sect. *Russularia* FR.

Epicr. Myc. 341, 1838.

Lamellae pallid, then discolored, afterwards darker, glancing when turned to the light, at length white pruinose; latex at first white, mild, or mild becoming acrid.

Subsect. Viscidi IMAI

Bot. Mag. (Tokyo), XLIX, 608, 1935.

Pileus primitus viscosus.

12. *Lactarius avellaneus* IMAI

Bot. Mag. (Tokyo), XLIX, 608, 1835.

Solitary or somewhat gregarious. Pileus 2–4 cm. broad, convex then plane, at length slightly depressed at the center, sometimes with a small umbo; surface smooth, glabrous, slightly viscid when moist, slightly polished, pale chestnut color at the center, margin paler; context whitish or grayish, rather thick; latex white, becoming a yellowish-white mass when dried, acrid, odour none; lamellae adnate-decurrent, white, then dingy, pruinose when dry, crowded; stipe 2–4 cm. long, 5–7 mm. thick, equal or slightly enlarged at the base, yellowish or brownish, uneven, glabrous, but appears as powdery, hollow; spores white in mass, broadly ellipsoidal or subglobose, echinulate, 8–10 × 7.5–8 μ.

Hab. on the ground in woods. Autumn. Ishikari (Mt. Kurodake).

Distr. Endemic.

Jap. name. *Kôiro-chichitake* (IMAI).

13. *Lactarius vietus* FR.

Epicr. Myc. 344, 1838; Monogr. Hymen. Suec. II, 171, 1863; Hymen. Eur. 432, 1874—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 200, 1872; Ench. Fung. 129, 1886—GILL. Hymen. Fr. 206, cum icone, 1874 —KARST. Hattsv. I, 191, 1879—WINT. Die Pilze, I, 546, 1884—SACC. Syll. Fung. V, 441, 1887; Fl. Ital. Crypt., Hymen. 391, 1915—CKE. Ill. Brit. Fung. pl. 1009, f. A, 1888—MASS. Brit. Fung. Fl. III, 24, 1893—W. G. SM. Brit. Basid. 275, 1908

—RICKEN, Blätterp. 37, pl. 14, f. 1, 1915—KAUFFM. Agar. Mich. 109, 1918—REA, Brit. Basid. 489, 1922—BRES. Icon. Myc. VIII, pl. 379, 1928—LANGE, Agar. Denm. VII, 31, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 608, 1935]

Agaricus (Galorrheus) victus FR. Syst. Myc. I, 66, 1821—RABENH. Deut. Krypt. Fl. I, 548, 1844.

Lactaria victa SCHROET. Pilze Schles. I, 541, 1889.

Solitary or gregarious. Pileus 3–6 cm. broad, convex, then depressed, sometimes subpapillate, to umbilicate, at length subinfundibuliform; surface avellaneous, cinnamon-buff, dark-olive-buff or pinkish buff, paler at the margin, viscid when wet, azonate, glabrous, silky or minutely silky-tomentose when dry, margin involute at first, then elevated and arched; context whitish, then gray; latex watery-white, then gray or unchanging, very slowly acrid; lamellae adnate-decurrent or subdecurrent, white then yellowish, subcrowded or subdistant, often forking next the stipe, thin; stipe 4–7 cm. long, 5–12 mm. thick, equal or attenuated upward, concolorous or paler, glabrous, rivulose-wrinkled, stuffed then hollow; spores whitish in mass, globose, subglobose or broadly ellipsoidal, echinulate, 7–10 × 7–8 μ.

Hab. on the ground in woods. Late summer to autumn. Ishikari (Nopporo, Mt. Kurodake), Iburi (Lake side of Shikotsu), Kitami (Oketo forest), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Ko-kihada-chichitake* (IMAI).

14. *Lactarius quietus* FR.

Epicr. Myc. 343, 1838; Hymen. Eur. 431, 1874—BERK. Outl. Brit. Fung. 207, 1860—CKE. Handb. Brit. Fung. I, 214, 1871; Ill. Brit. Fung. pl. 983, 1888—GILL. Hymen. Fr. 220, 1874—KARST. Hattsv. I, 189, 1879—QUÉL. Ench. Fung. 129, 1886—SACC. Syll. Fung. V, 440, 1887; Fl. Ital. Crypt., Hymen. 392, 1915—MASS. Brit. Fung. Fl. III, 21, 1893—W. G. SM. Brit. Basid. 274, 1908—RICKEN, Blätterp. 38, pl. 14, f. 2, 1915—REA, Brit. Basid. 488, 1922—LANGE, Agar. Denm. VII, 37, 1928—BRES. Icon. Myc. VIII, pl. 376, 1928.

Agaricus (Galorrheus) quietus FR. Syst. Myc. I, 69, 1821.

Lactaria quieta SCHROET. Pilze Schles. I, 537, 1889—BURLINGH. Lactariae U. S. 63, 1908; North Amer. Fl. IX, 188, 1910.

Gregarious or solitary, edible. Pileus 3–7 cm. broad, convex, then depressed; surface cinnamon or reddish-cinnamon, disc darker, obscurely zonate with darker color, slightly viscid at first, soon dry,

glabrous; context white, becoming brownish; latex white, unchanging, mild; lamellae adnate-decurrent, white, becoming reddish-brownish, crowded, somewhat forking near the stipe; stipe 3–7 cm. long, 4–10 mm. or more thick, equal, subconcolorous, then becoming rubiginous or darker, glabrous, smooth, stuffed then hollow; spores white in mass, subglobose, 8–10 × 8 μ, echinulate.

Hab. *on the ground in woods. Late summer to autumn.* Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Chôji-chichitake* (n. n.).

15. *Lactarius thejogalus* [BULL.] FR.

Epicr. Myc. 342, 1838; Monogr. Hymen. Suec. II, 170, 1863; Hymen. Eur. 432, 1874—BERK. Outl. Brit. Fung. 206, 1860—KICKX, Fl. Crypt. Flandr. II, 202, 1867—CKE. Handb. Brit. Fung. I, 214, 1871—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 199, 1872; Ench. Fung. 129, 1886—GILL. Hymen. Fr. 208, cum icone, 1874—KARST. Hattsv. I, 190, 1879—WINT. Die Pilze, I, 547, 1884—SACC. Syll. Fung. V, 441, 1887; Fl. Ital. Crypt., Hymen. 390, 1915—MASS. Brit. Fung. Fl. III, 22, 1893—W. G. SM. Brit. Basid. 275, 1908—ROLLAND, Atlas Champ. 34, f. 61, 1910—RICKEN, Blätterp. 36, pl. 13, f. 5, 1915—KAUFFM. Agar. Mich. 97, 1918—REA, Brit. Basid. 489, 1922—BRES. Icon. Myc. VIII, pl. 378, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 608, 1935]

Agaricus thejogalus BULL. Champ. Fr. pl. 567, f. 2, 1791 (teste FR.).

Agaricus (Galorrheus) thejogalus FR. Syst. Myc. I, 71, 1821—BERK. in SMITH, Engl. Fl. V, (2), 28, 1836—RABENH. Deut. Krypt. Fl. I, 549, 1844—BARLA, Champ. Nice, 39, pl. 20, f. 14–18, 1859—CORDA, Champ. Fr. II, 114, pl. 27, f. 2, 1870.

Gregarious or solitary, edible after BRESADOLA. Pileus 2–8 cm. broad, convex, then expanded to umbilicate or subinfundibuliform; surface incarnate-isabelline to pale tawny-reddish or fulvous, zonate to azonate, glabrous, viscid when moist, glossy when dry, even or wrinkled-uneven, margin at first involute soon spreading, pruinose to very minutely pruinose-downy on the extreme edge; context white, becoming yellow from the latex, moderately thick, compact; latex white, changing to sulphur-yellow, bitterish, then acrid; lamellae adnate-subdecurrent, crowded, rather narrow, whitish to yellowish, reddish-brown when old or where bruised, some forking near the stipe; stipe 3–6 cm. long, 5–12 mm. thick, subequal, subconcolorous or paler, sometimes faintly spotted, undulate-uneven, glabrous but often

slightly tomentose at the base, stuffed, then hollow; spores white in mass, subglobose or broadly ellipsoidal, echinulate, 8–10 × 7–8 μ.

Hab. *on the ground in woods. Late summer to autumn.* Ishikari (Mt. Kurodake), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Ki-chichitake* (IMAI).

Subsect. **Impoliti** IMAI

Bot. Mag. (Tokyo), XLIX, 609, 1935.

Pileus impolitus, squamulosus, villosus vel pruinosus.

16. ***Lactarius rufus*** [SCOP.] FR.

Epicr. Myc. 347, 1838; Monogr. Hymen. Suec. II, 173 1863; Hymen. Eur. 433, 1874—BERK. Outl. Brit. Fung. 208, 1860—CKE. Handb. Brit. Fung. I, 215, 1871; Ill. Brit. Fung. pl. 985, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 200, 1872; Ench. Fung. 130, 1886—GILL. Hymen. Fr. 225, cum icone, 1874—KARST. Hattsv. I, 192, 1879—WINT. Die Pilze, I, 545, 1884—SACC. Syll. Fung. V, 442, 1887; Fl. Ital. Crypt., Hymen. 381, 1915—MASS. Brit. Fung. Fl. III, 25, 1893—W. G. SM. Brit. Basid. 275, 1908—ROLLAND, Atlas Champ. 37, f. 71, 1910—RICKEN, Blätterp. 36, pl. 13, f. 3, 1915—KAUFFM. Agar. Mich. 107, 1918—REA, Brit. Basid. 490, 1922—BRES. Icon. Myc. VIII, pl. 381, 1928—LANGE, Agar. Denm. VII, 35, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 609, 1935]

Agaricus rufus SCOP. Fl. Carn. ed. 2, II, 451, 1772 (teste FR.).

Agaricus (Galorrheus) rufus FR. Syst. Myc. I, 71, 1821—BERK. in SMITH, Engl. Fl. V, (2), 28, 1836—RABENH. Deut. Krypt. Fl. I, 546, 1844—CORDA, Champ. Fr. II, 113, 1870.

Lactaria rufa SCHROET. Pilze Schles. I, 539, 1889—BURLINGH. Lactariae U. S. 75, 1908; North Amer. Fl. IX, 192, 1910.

Solitary or gregarious. Pileus 3–10 cm. broad, convex with an umbo, or umbonate, then depressed with an umbo, at length subinfundibuliform; surface vinaceous-tawny to ocher-red, not fading, azonate, dry, minutely flocculoso-silky, then glabrous and shining, margin involute at first, whitish-tomentose, then glabrous; context pallid, or tinged with pink, not compact, inodourous; latex white, unchanging, very acrid; lamellae decurrent, light pinkish-cinnamon or ochraceous, then buff-pink or rufous, crowded, sometimes forking; stipe 3–10 cm. long, 6–10 mm. thick, nearly equal or attenuated down-

ward, subconcolorous or paler than the pileus, dry, glabrous or sometimes pruinose and white pubescent at the base, stuffed, at length sometimes hollow; spores white in mass, subglobose or broadly ellipsoidal, echinulate, 8–10 × 7–8 μ.

Hab. on the ground under conifers. Late summer to autumn. Ishikari (Alpine region of Mt. Taisetsu), Kushiro (Alpine region of Mt. Meakan).

Distr. *Japan (Hokkaido, Honshu), Europe, North America.*

Jap. name. *Aka-chichitake* (IMAI).

17. *Lactarius helvus* FR.

Epicr. Myc. 347, 1838; Monogr. Hymen. Suec. II, 174, 1863; Hymen. Eur. 433, 1874—QUÉL. Champ. Jura Vosg. 3 Suppl., in Mém. Soc. D'Emul. Montb. 2 sér. V, 440, 1875; Ench. Fung. 130, 1886—KARST. Hattsv. I, 192, 1879—WINT. Die Pilze, I, 545, 1884—SACC. Syll. Fung. V, 443, 1887; Fl. Ital. Crypt., Hymen. 395, 1915—MASS. Brit. Fung. Fl. III, 25, 1893—W. G. SM. Brit. Basid. 275, 1908—RICKEN, Blätterp. 35, pl. 13, f. 2, 1915—KAUFFM. Agar. Mich. 106, 1918—REA, Brit. Basid. 490, 1922—BRES. Icon. Myc. VIII, pl. 382, 1928—LANGE, Agar. Denm. VII, 34, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 609, 1935]

Agaricus (Galorrheus) helvus FR. Syst. Myc. I, 72, 1821—RABENH. Deut. Krypt. Fl. I, 546, 1844.

Lactaria helva SCHROET. Pilze Schles. I, 539, 1889—BURLINGH. Lactariae U. S. 74, 1908; North Amer. Fl. IX, 191, 1910.

Solitary or gregarious, said to be edible. Pileus 4–10 cm. broad, *convex, then plane to depressed; surface dry, azonate, densely covered* with isabelline colored short hairs, fine scales or wart-like small scales, darker at the center; margin involute at first, then spreading; context whitish at first, finally yellowish, almost mild; latex white, watery, mild to subacrid, unchanging in color; lamellae decurrent, very crowded, white, then becoming ochraceous, sometimes forking elsewhere especially near the stipe; stipe 3–8 cm. long, 1–1.5 cm. thick, equal or slightly attenuated upward, subconcolorous or paler, pruinose, pubescent at the base, stuffed, then hollow; spores pale ochraceous in mass, subglobose or broadly ellipsoidal, 7–9 × 5.5–6.5 μ, echinulate.

Hab. on the ground under conifers, *Pinus pumila* REGEL. in our cases. Autumn. Kushiro (Alpine region of Mt. Meakan).

Distr. Japan (Hokkaido), Siberia, Europe, North America.

Jap. name. *Aka-chichi-modoki* (IMAI).

18. *Lactarius griseus* PK.

23 Ann. Rep. N. Y. State Cab. 119, 1872—SACC. Syll. Fung. V, 444, 1887.

[IMAI, Bot. Mag. (Tokyo), XLIX, 609, 1935]

Lactaria grisea BURLINGH. Lactariae U. S. 80, f. 14, 1908; North Amer. Fl. IX, 192, 1910.

Gregarious or solitary. Pileus 1–5 cm. broad, convex, then plane, at length depressed, with a small umbo; surface avellaneous (sec. SACCARDO), pinkish-buff (sec. RIDGWAY), minute-tomentose or velvety, dry, azonate, margin involute, then spreading, entire; context whitish, thin, unchanging; latex white, unchanging color, acrid, odour slight but not cinnamon-like; lamellae decurrent, crowded, whitish or straw-colored, then ochraceous; stipe 1.5–5 cm. long, 3–7 mm. thick, nearly equal, subconcolorous or paler, glabrous, but appears as powdery, uneven, hollow; spores white in mass, broadly ellipsoidal, echinulate, 7.5–10 × 5–7.5 μ.

Hab. on the ground among mosses in woods. Autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido, Honshu), North America, Europe.

Jap. name. *Haiiro-chichitake* (IMAI).

19. *Lactarius Sakamotoi* IMAI

Bot. Mag. (Tokyo), XLIX, 609, 1935.

Gregarious or solitary. Pileus 2–3 cm. broad, umbilicate then infundibuliform; surface dry, densely covered with minute fibrous scales, at first dark mouse-gray, blackish mouse-gray or olivaceous-black, then becoming slightly paler and changing to deep mouse-gray on the center and more pale on the margin; margin incurved; context pallid, thin, unchanging color; latex white, unchanging, acrid; lamellae decurrent, pallid, then light ochraceous-buff or salmon-buff and slightly pruinose, connected or forking near the stipe, crowded; stipe 2–4.5 cm. long, 3–4 mm. thick, equal or slightly attenuated upward, light drab to hair-brown, naked, hollow; spores ochraceous in mass, broadly ellipsoidal or subglobose, echinulate, 6–8 × 5–7 μ.

Hab. on the ground in woods. Autumn. Ishikari (Mt. Sapporo).

Distr. Endemic.

Jap. name. *Hime-aiiro-chichitake* (IMAI).

20. *Lactarius hygrophoroides* BERK. et CURT.

Ann. Mag. Nat. Hist. 3 ser. IV, 293, 1859—SACC. Syll. Fung. V, 448, 1887; Fl. Ital. Crypt., Hymen. 398, 1915—KAUFFM. Agar. Mich. 114, 1918.

Lactarius distans PK. 23 Ann. Rep. N. Y. State Cab. 117, 1872; Mem. N. Y. State Mus. No. 4, III, 151, pl. 53, f. 7–11, 1900—SACC. Syll. Fung. V, 448, 1887.

Lactaria hygrophoroides P. HENN. in ENGLER & PR. Nat. Pflanzenfam. I, 1**, 214, 1898—BURLINGH. Lactariae U. S. 92, 1908; North Amer. Fl. IX, 196, 1910.

Gregarious or solitary, edible. Pileus 3–10 cm. broad, convex, then expanded, depressed at the center, finally umbilicate or subinfundibuliform; surface dry, subglabrous or very minutely pruinose-velvety, sometimes rugose-wrinkled or rimose-areolate, ochraceous-buff or brownish-orange to fulvous or bister, azonate, margin involute, then spreading or uplifted; context whitish, thick, brittle; latex white, unchanging, not staining the lamellae or context, mild, odour none, somewhat abundant; lamellae adnate-subdecurrent, whitish, then cream or yellowish, not discoloring where injured, not forking, distant, often intervenose, rather narrow; stipe 2–5 cm. long, 5–15 mm. thick, equal or attenuated downward, concolorous, glabrous or pruinose, solid or stuffed; spores white in mass, globose or broadly ellipsoidal, minutely echinulate, 8–11 μ in diam.

Hab. *on the ground in woods. Summer to autumn.* Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), North America, Europe (Italy).

Jap. name. *Hiroba-chichitake* (n. n.).

21. *Lactarius lignyotus* FR.

Monogr. Hymen. Suec. II, 177, 1863; Hymen. Eur. 434, 1874—QUÉL. Ench. Fung. 130, 1886—KARST. Hattsv. I, 194, 1879—WINT. Die Pilze, I, 544, 1884—SACC. Syll. Fung. V, 445, 1887; Fl. Ital. Crypt., Hymen. 396, 1915—MASS. Brit. Fung. Fl. III, 29, 1893—ATKINS. Mushrooms, ed. 2, 117, f. 119, 1903—W. G. SM. Brit. Basid. 277, 1908—RICKEN, Blätterp. 35, 1915—KAUFFM. Agar. Mich. 106, 1918—REA, Brit. Basid. 492, 1922—BRES. Icon. Myc. VIII, pl. 386, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 610, 1935]

Lactarius fuliginosus var. *major* FR. Epicr. Myc. 348, 1838.

Lactariella lignyota SCHROET. Pilze Schles. I, 544, 1889.

Lactaria lignyota BURLINGH. Lactariae U. S. 86, 1908; North Amer. Fl. IX, 194, 1910.

Solitary or gregarious, edible. Pileus 3–8 cm. broad, convex, then plane to slightly depressed, umbonate; surface plicately rugulose or wrinkled sulcate, dark-brown or sooty (chocolate to seal-brown), dry, azonate, pruinosely velvety, margin at first incurved, sometimes plicate; context rather firm, white, becoming slowly pinkish or salmon where wounded; latex watery-white, changing to salmon-pink or saffron color where in contact with the broken context, mild or finally slightly acrid; lamellae decurrent, white or ochraceous, becoming pinkish or salmon where wounded, rather not crowded, of various lengths, about 5 mm. broad, thin; stipe 6–12 cm. long, 7–15 mm. thick, equal or abruptly smaller and plicate at the apex, smooth, concolorous, paler at the base, pruinosely velvety, stuffed; spores ochraceous in mass, globose, echinulate, 9–10 μ.

Hab. on the ground in woods, especially in coniferous woods. Late summer to autumn. Ishikari (Mt. Taisetsu), Iburi (Lake side of Shikotsu), Kushiro (Mt. Meakan), Kitami (Oketo forest).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Kuro-chichitake* (IMAI).

22. *Lactarius fuliginosus* FR.

Epicr. Myc. 348, 1838; Monogr. Hymen. Suec. II, 178, 1863; Hymen. Eur. 434, 1874—BERK. Outl. Brit. Fung. 209, 1860—CKE. Handb. Brit. Fung. I, 215, 1871; Ill. Brit. Fung. pl. 996, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 201, 1872—GILL. Hymen. Fr. 207, cum icone, 1874—KARST. Hattsv. I, 194, 1879—WINT. Die Pilze, I, 544, 1884—SACC. Syll. Fung. V, 446, 1887; Fl. Ital. Crypt., Hymen. 393, 1915—MASS. Brit. Fung. Fl. III, 27, 1893—W. G. SM. Brit. Basid. 276, 1908—RICKEN, Blätterp. 34, pl. 12, f. 5, 1915—KAUFFM. Agar. Mich. 105, 1918—REA, Brit. Basid. 492, 1922—BRES. Icon. Myc. VIII, pl. 385, 1928—LANGE, Agar. Denm. VII, 33, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 610, 1935]

Agaricus azonites BULL. Champ. Fr. pl. 567, f. 3, 1791 (teste FR.).

Agaricus plinthogalus OTTO, Versuch. Agar. 75, 1816 (teste BURLINGH.).

Agaricus (*Galorrheus*) *fuliginosus* FR. Syst. Myc. I, 73, 1821—RABENH. Deut. Krypt. Fl. I, 546, 1844.

Lactarius fumosus PK. 24 Ann. Rep. N. Y. State Mus. 74, 1872 (teste BURLINGH.).

Lactarius azonites QUÉL. Ench. Fung. 130, 1886.

Lactariella azonites SCHROET. Pilze Schles. I, 544, 1889.

Lactaria plinthogala BURLINGH. Lactariae U. S. 84, 1908; North Amer. Fl. IX, 194, 1910.

Solitary or gregarious. Pileus 2–7 cm. broad, convex, then plane, depressed at the center, finally subinfundibuliform; surface at first whitish, grayish, pale olive-buff, avellaneous, pinkish-buff, or cinnamon-buff, then darkening to buffy-brown, Saccardo's umber or snuff-brown, dry, glabrous, but appears slightly velvety and blooming, uneven or rugulose, especially when matured or drying, margin paler, entire or wavy, inflexed at first; context white, changing to flesh-color or fleshy-ocher where exposed to air; latex white then flesh color or salmon-pink, becoming whitish-powdery when dried, mild then acrid; lamellae adnate, adnexed or slightly decurrent, nearly white at first, then tinged with pale yellow-ochraceous, rather crowded, thin, finally or on drying becoming slightly pruinose, sometimes connected by vein-like reticulations, sometimes forking near the stipe, becoming pinkish or salmon where wounded; stipe 3–8 cm. long, 5–10 mm. thick, nearly equal, rugulose, dead white, then shell-pink, pinkish-buff or vinaceous-buff or subconcolorous, glabrous or slightly pruinose, downy at the base, firm, stuffed then hollow; spores ochraceous in mass, globose, echinulate, 6–10 μ.

Hab. on the ground in woods, deciduous, mixed or coniferous. Late summer to autumn. Ishikari (Nopporo, Mt. Kurodake), Iburi (Lake side of Shikotsu), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America.

Jap. name. *Usuzumi-chichitake* (IMAI).

23. *Lactarius luteolus* PK.

Bull. Torrey Bot. Club, XXIII, 412, 1896—SACC. Syll. Fung. XIV, 94, 1899—KAUFFM. Agar. Mich. 115, 1918.

Lactarius foetidus PK. 54 Bull. N. Y. State Mus. 949, 1902 (teste PECK).

Lactaria luteola BURLINGH. Lactariae U. S. 95, 1908; North Amer. Fl. IX, 197, 1910.

Solitary or gregarious, edible. Pileus 4–6 cm. or more broad, convex, then nearly plane, somewhat depressed at the center; surface dry, pinkish-cinnamon or cinnamon-buff, or paler, azonate, minutely pruinose-velvety, sometimes slightly rugose, margin involute, then arched; context whitish, staining brown where injured; latex white, mild, abundant, staining the context and lamellae brown when exposed to the air; lamellae adnate or adnexed with a slightly decurrent tooth, whitish then yellowish, becoming brown where injured, close,

narrow; stipe 3–4 cm. or more long, 7–15 mm. thick, subequal, concolorous, dry, rugulose, pruinose-velvety, stuffed; spores white in mass, subglobose or broadly ellipsoidal, echinulate, 7–8 × 6.5–7.5 μ.

Hab. on the ground in woods. Late summer to autumn. Ishikari (Nopporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido), North America.

Jap. name. *Birôdo-chichitake* (n. n.).

Subsect. Glabrati IMAI

Bot. Mag. (Tokyo), XLIX, 610, 1935.

Pileus politus, glabrus.

24. *Lactarius volemus* FR.

Epicr. Myc. 344, 1838; Monogr. Hymen. Suec. II, 178, 1863; Hymen. Eur. 435, 1874—BERK. Outl. Brit. Fung. 207, 1860—KICKX, Fl. Crypt. Flandr. II, 202, 1867—CKE. Handb. Brit. Fung. I, 216, 1871; Ill. Brit. Fung. pl. 999, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 201, 1872—GILL. Hymen. Fr. 221, cum icone, 1874—KARST. Hattsv. I, 196, 1879—WINT. Die Pilze, I, 543, 1884—SACC. Syll. Fung. V, 447, 1887; Fl. Ital. Crypt., Hymen. 398, 1915—MASS. Brit. Fung. Fl. III, 31, 1893—ATKINS. Mushrooms, ed. 2, 115, f. 118, 1903—W. G. SM. Brit. Basid. 277, 1908—KAWAMURA, Bot. Mag. (Tokyo), XXII, (409), 1908; Ill. Jap. Fung. pl. 6, f. 21–23, 1913—ROLLAND, Atlas Champ. 38, f. 72, 1910—RICKEN, Blätterp. 38, pl. 14, f. 3, 1915—KAUFFM. Agar. Mich. 112, pl. 12, 1918—REA, Brit. Basid. 493, 1922—BRES. Icon. Myc. VIII, pl. 390, 1928—LANGE, Agar. Denm. VII, 35, 1928.

[SHIRAI, List Jap. Fung. ed. 2, 309, 1917; ed. 3, 181, 1927—UMEMURA, Pl. Fujiyama. 368, 1923—IMAI, Bot. Mag. (Tokyo), XLIX, 610, 1935]

Agaricus lactifluus L. Sp. Pl. 1172, 1753 (teste FR.).

Agaricus oedematopus SCOP. Fl. Carn. ed. 2, II, 453, 1772 (teste FR.).

Agaricus testaceus ALB. et SCHW. Consp. Fung. Lusat. 209, 1805 (teste FR.).

Agaricus (*Galorrheus*) *volemus* FR. Syst. Myc. I, 69, 1821—BERK. in SMITH, Engl. Fl. V, (2), 27, 1836—RABENH. Deut. Krypt. Fl. I, 548, 1844—BARLA, Champ. Nice, 36, pl. 20, f. 1–3, 1859—CORDA, Champ. Fr. II, 116, pl. 26, f. 2, 1870.

Lactarius lactifluus QUÉL. Ench. Fung. 131, 1886.

Lactaria volema SCHROET. Pilze Schles. I, 535, 1889.

[MATSUM. Ind. Pl. Jap. I, 149, 1904]

Lactaria lactiflua BURLINGH. Lactariae U. S. 90, 1908; North Amer. Fl. IX, 195, 1910.

Gregarious or solitary, edible. Pileus 2.5–13 cm. broad, convex then expanded to nearly plane or slightly depressed; surface buff-yellow to orange-buff, sometimes paler, azonate, dry, glabrous, even or at length rimoso-rivulose; context yellowish or whitish, firm, rather thin, becoming brownish on exposure to air, taste mild, odour pleasant; latex white, rather sticky, unchanging or at length becoming yellowish, mild, abundant, staining the context and lamellae brown; lamellae slightly decurrent or adnato-decurrent, white, then yellowish, changing brownish where injured, often forked and connected, crowded, narrow; stipe 4–11 cm. long, 6–25 mm. thick, nearly equal, dry, concolorous, glabrous, pruinose, even, uneven or subrivulose, *stuffed; spores white in mass*, subglobose, echinulate, 7.5–10 μ in diam.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo, Mt. Teine), Oshima (Ônomura).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe, North America.

Jap. name. *Chichitake* (KAWAMURA).

25. *Lactarius subdulcis* [PERS.] FR.

Epicr. Myc. 345, 1838; Monogr. Hymen. Suec. II, 180, 1863; Hymen. Eur. 437, 1874—BERK. Outl. Brit. Fung. 208, 1860—KICKX, Fl. Crypt. Flandr. II, 203, 1867—CKE. Handb. Brit. Fung. I, 217, 1871; Ill. Brit. Fung. pl. 1002, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 202, pl. 11, f. 3, 1872; Ench. Fung. 131, 1886—GILL. Hymen. Fr. 224, cum icone, 1874—KARST. Hattsv. I, 198, 1879—WINT. Die Pilze, I, 541, 1884—SACC. Syll. Fung. V, 450, 1887; Fl. Ital. Crypt., Hymen. 402, 1915—MASS. Brit. Fung. Fl. III, 33, 1893—W. G. SM. Brit. Basid. 278, 1908—ROLLAND, Atlas Champ. 38, f. 73, 1910—RICKEN, Blätterp. 39, 1915—KAUFFM. Agar. Mich. 115, 1918—REA, Brit. Basid. 494, 1922—BRES. Icon. Myc. VIII, pl. 393, 1928—LANGE, Agar. Denm. VII, 37, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 610, 1935]

Agaricus subdulcis PERS. Syn. Fung. 433, 1801 (teste FR.).

Agaricus (*Galorrheus*) *subdulcis* FR. Syst. Myc. I, 70, 1821, excl. β—BERK. in SMITH, Engl. Fl. V, (2), 28, 1836—RABENH. Deut. Krypt. Fl. I, 547, 1844—BARLA, Champ. Nice, 37, pl. 20, f. 4–10, 1859—CORDA, Champ. Fr. II, 113, pl. 26, f. 1, 1870.

Lactaria subdulcis SCHROET. Pilze Schles. I, 535, 1889—BURLINGH. Lactariae U. S. 100, 1908; North Amer. Fl. IX, 198, 1910.

Lactarius subserifluus LONGYEAR, Rep. Mich. Acad. Sci. III, 57, 1902 (teste BURLINGH.).

Gregarious or solitary, edible. Pileus 1–6 cm. broad, convex, papillate, then depressed to subinfundibuliform; surface fulvous, isabelline or reddish-fulvous, not fading, azonate, dry, glabrous, smooth or slightly rugulose, margin involute at first, then spreading, sometimes flexuous; context thin, firm, fragile, whitish or tinged with isabelline or fulvous, odourless, taste mild; latex white or watery-white, unchanging, mild or slowly acrid to bitterish; lamellae adnate or adnate with a decurrent tooth, whitish or tinged with isabelline, becoming pruinose, crowded; stipe 1–7 cm. long, 2–10 mm. thick, equal, subconcolorous or slightly paler, glabrous, sometimes white pubescent at the base, dry, stuffed then hollow; spores white in mass, broadly ellipsoidal or subglobose, 7–10 × 6.5–7.5 μ, echinulate.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo, Mt. Moiwa), Iburi (Lake side of Shikotsu), Tokachi (Mt. Nupukaushinupri), Kitami (Oketo forest, Biwaushizawa).

Distr. Japan (Hokkaido, Honshu), China, Siberia, Europe, North America.

Jap. name. *Hime-chichitake* (IMAI).

Sect. **Dapetes** FR.

Epicr. Myc. 341, 1838.

Lamellae naked; latex always deeply colored.

26. ***Lactarius deliciosus*** [L.] FR.

Epicr. Myc. 341, 1838; Monogr. Hymen. Suec. II, 168, 1863; Hymen. Eur. 431, 1874—BERK. Outl. Brit. Fung. 206, 1860—KICKX, Fl. Crypt. Flandr. II, 201, 1867—CKE. Handb. Brit. Fung. I, 213, 1871; Ill. Brit. Fung. pl. 982, 1888—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 199, 1872; Ench. Fung. 129, 1886—GILL. Hymen. Fr. 204, cum icone, 1874—KARST. Hattsv. I, 188, 1879—WINT. Die Pilze, I, 548, 1884—SACC. Syll. Fung. V, 438, 1887; Fl. Ital. Crypt., Hymen. 373, 1915—TANAKA, Bot. Mag. (Tokyo), IV, 394, 1890—MASS. Brit. Fung. Fl. III, 19, 1893—ATKINS. Mushrooms, ed. 2, 123, pl. 39, f. 1, 1903—W. G. SM. Brit. Basid. 274, 1908—ROLLAND, Atlas Champ. 36, f. 69, 1910—KAWAMURA, Ill. Jap. Fung. pl. 10, f. 19–22, 1914—RICKEN, Blätterp. 31, 1915—KAUFFM. Agar. Mich. 103, pl. 11, 1918—REA, Brit. Basid. 487, 1922—BRES. Icon. Myc. VIII, pl. 373, 1928—LANGE, Agar. Denm. VII, 41, 1928.

[MATSUM. Ind. Pl. Jap. I, 149, 1904—YASUDA, Bot. Mag. (Tokyo), XXVII, (561), 1913]

Agaricus deliciosus L. Sp. Pl. 1172, 1753—Sow. Engl. Fung. pl. 202, 1799 (teste FR.).

Agaricus (Galorrheus) deliciosus FR. Syst. Myc. I, 67, 1821—BERK. in SMITH, Engl. Fl. V, (2), 26, 1836—RABENH. Deut. Krypt. Fl. I, 550, 1844—BARLA, Champ. Nice, 34, pl. 19, f. 1–5, 1859—CORDA, Champ. Fr. II, 110, 1870.

Lactaria deliciosa SCHROET. Pilze Schles. I, 543, 1889—BURLINGH. Lactariae U. S. 58, 1908; North Amer. Fl. IX, 186, 1910.

[MATSUM. Ind. Pl. Jap. I, 149, 1904]

Lactarius Akahatsu TANAKA, Bot. Mag. (Tokyo), IV, 394, pl. 16, 1890—SACC. Syll. Fung. XIV, 95, 1899—KAWAMURA, Ill. Jap. Fung. pl. 7, f. 11–14, 1913.

[SHIRAI, List Jap. Fung. 45, 1905; ed. 2, 309, 1917; ed. 3, 180, 1927—SAWADA, Descr. Catalog. Formosan Fung. I, 512, 1919]

Laciaria Akahatsu MATSUM. Ind. Pl. Jap. I, 149, 1904.

Lactarius deliciosus var. *japonicus* KAWAMURA, Jap. Fung. no. 50, 1929.

[MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 113, 1931]

Gregarious or solitary, edible. Pileus 4–15 cm. broad, convex with a depressed center, then depressed plane, at length broadly infundibuliform; surface viscid when moist, glabrous, somewhat roughened, orange, yellow-orange or paler, zoned with deeper orange, becoming paler with age, sometimes not zoned especially when old or dried, rarely mixed with grayish or greenish tints, margin naked, incurved at first, finally upturned; context firm, rigid, orangish or whitish, often becoming greenish, taste mild or slightly aromatic and acrid; latex orange or scarlet, mild or slightly aromatic and acrid; lamellae subdecurrent, crowded, narrow, many forking near the the stipe, ochraceous-salmon, paler when old or dried, often stained with grayish or greenish tints when old or bruised; stipe 3–10 cm. long, 8–17 mm. thick, equal or attenuated downward, concolorous or brighter or paler, spotted with brighter orange, glabrous or sometimes a little tomentose at the base, stuffed then hollow, fragile, rarely stained with greenish tint; spores yellowish in mass, subellipsoidal or subglobose, 8–10 × 7–8 μ, echinulate.

The present species varies in color from bright orange to pale yellow and in zonation from distinctly zonate to nearly azonate. In general, the color and zonation of the pileus are conspicuous in the younger stage. The color of the context and lamellae changes rapidly to greenish when bruised or wounded and the whole plant often becomes greenish in the older stage. There is also a form without such greening which is usually brighter in color. The latter form is collected mostly in *Abies* woods, while the other is found in

pine or *Picea* woods. The present writer formerly separated these two as two forms:

Forma *laeticolorus* IMAI

Bog. Mag. (Tokyo), XLIX, 607, 1935.

Pileus brighter in color; wounds hardly or very slightly greening.

Hab. on the ground in woods, especially in *Abies* woods. Late summer to autumn. Ishikari (Nopporo, Mt. Teine, Jôzankei, Mt. Kurodake), Kushiro (Lake side of Akan), Oshima (Ônomura), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu), ?Europe, ?North America.

Jap. name. *Akamomitake* (KAWAMURA).

Forma *virescens* IMAI

Bot. Mag. (Tokyo), XLIX, 607, 1935.

Pileus darker or sordid in color; wounds greening.

Hab. on the ground in woods, especially of *Pinus* or *Picea*. Late summer to autumn. Ishikari (Mt. Kurodake, Sapporo, Nopporo), Iburi (Lake side of Shikotsu), Oshima (Ônomura).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Akahatsu* (TANAKA).

27. *Lactarius sanguifluus* [PAUL.] FR.

Epicr. Myc. 341, 1838; Hymen. Eur. 431, 1874—GILL. Hymen. Fr. 202, 1874—QUÉL. Champ. Jura Vosg. 10 Suppl., in Assoc. Fr. IX, 667, 1880; Ench. Fung. 129, 1886—SACC. Syll. Fung. V, 439, 1887; Fl. Ital. Crypt., Hymen. 374, 1915—W. G. SM. Brit. Basid. 274, 1908—ROLLAND, Atlas Champ. 37, f. 70, 1910—RICKEN, Blätterp. 31, pl. 11, f. 5, 1915—REA, Brit. Basid. 488, 1922—BRES. Icon. Myc. VIII, pl. 374, 1928.

[IMAI, Bot. Mag. (Tokyo), XLIX, 607, 1935]

Hypophyllum sanguifluum PAUL. Traité Champ. pl. 81, f. 3–5, 1793 (*teste* FR.).

Lactarius sanguifluus var. *vinosus* QUÉL. Champ. Jura Vosg. 10 Suppl., in Assoc. Fr. IX, 668, pl. 8, f. 8, 1880; Ench. Fung. 129, 1886.

Lactarius subpurpureus PK. 29 Ann. Rep. N. Y. State Mus. 43, 1878—SACC. Syll. Fung. V, 439, 1887.

Lactarius Hatsudake TANAKA, Bot. Mag. (Tokyo), IV, 393, pl. 15, 1890—SACC. Syll. Fung. XIV, 95, 1899—KAWAMURA, Ill. Jap. Fung. pl. 7, f. 5–7, 1913. [SAWADA, Descrip. Catal. Formosan. Fung. I, 513, 1919—UMEMURA, Pl. Fujiyama. 368, 1923]

Lactaria Hatsudake MATSUM. Ind. Pl. Jap. I, 149, 1904.

Lactaria subpurpurea BURLINGH. Lactariae U. S. 60, 1908; North Amer. Fl. IX, 187, 1910.

Gregarious or solitary, edible. Pileus 4–17 cm. broad, convex-umbilicate, then plane and depressed, finally infundibuliform; surface slightly viscid, glabrous, onion-skin-pink or light-reddish brown or purplish brown, zoned with darker color, sometimes with a grayish luster, zones becoming less marked with age, margin at first involute and white pruinose or with a grayish luster, then plane to uplifted, the whole spotted more or less with emerald-green when matured or rubbed; context whitish, tinged with blood-red after the latex especially near the pellicle of the stipe and next the lamellae, becoming greenish after some time, firm, odour pleasant, taste slightly acrid and not mild; latex blood-red or dark-red (morocco-red or claret-brown), slightly acrid not mild; lamellae concolorous with pileus, often forking and often mixed with short ones on the peripheral portion, subdecurrent, very crowded, staining emerald-green where bruised; stipe 2–8 cm. long, 8–25 mm. thick, equal or attenuated upward and at the base, glabrous or pruinose, concolorous, sometimes tomentose at the base, often spotted with dark-red or emerald-green, stuffed then hollow; spores yellowish in mass, subglobose or broadly ellipsoidal, echinulate, $8–10 \times 7–8\,\mu$.

Hab. on the ground in woods, especially in coniferous woods. Late summer to autumn. Ishikari (Sapporo), Iburi (Lake side of Shikotsu).

Distr. Japan (Hokkaido, Honshu, Bonin Islands, Formosa), Europe, North America.

Jap. name. *Hatsudake* (TANAKA).

Russula PERS. ex FR.

Genera Hymen. 9, 1836; Epicr. Myc. 349, 1838.

Russula PERS. Obs. Myc. I, 100, 1796 (sec. EARLE).
Agaricus § *Russula* PERS. Syn. Fung. 438, 1801.
Agaricus § *Russula* FR. Syst. Myc. I, 54, 1821.
Russulina SCHROET. Pilze Schles. I, 550, 1889.

Lactarelis EARLE, Bull. N. Y. Bot. Gard. V, 409, 1909.
Dixophyllum EARLE, Ibid. 410, 1909.
Omphalomyces BATT. ex EARLE, Ibid. 410, 1909.

Pileus fleshy, rigid, regular. Stipe central, fleshy, rigid. Lamellae adnate, sinuato-adnate, adnexed, free or decurrent, rigid, fragile. Spores white, cream, yellow, ochraceous or saffron-yellow in mass, globose, subglobose or ellipsoidal, echinulate, verrucose or subreticulate.

Type species: *Agaricus emeticus* SCHAEFF. ex FR.

Key to the sections, subsections and species in Hokkaido.

I. Pileus variously colored, viscid, not pruinose, not velvety, nor pubescent; context white, remaining white or becoming yellow...... Sect. Constantes.
  A. Spore-mass ochraceous to saffron-yellow.
    1. Fructification small, mild............. Subsect. Chamaeleontinae.
      a. Pileus olivaceous or yellow; lamellae white, becoming cream or light ochraceous-buff; stipe whitish...... *R. olivascens* (1).
    2. Fructification large, mild.................. Subsect. Alutaceinae.
      a. Pileus dark reddish-purple or blood-red, sometimes mixed with other shades; lamellae becoming deep ochraceous; stipe white, usually tinged with red.................... *R. alutaceus* (2).
      b. Pileus orange, yellow or red; lamellae becoming light ochraceous, vivid lemon-yellow on the edge; stipe lemon-yellow.... .... *R. aurata* (3).
  B. Spore-mass cream or pale ochraceous; fructification medium to large sized, not slender, red, golden or brown, mild or slightly acrid........ .... Subsect. Integrinae.
    1. Pileus carmine or dark carmine; taste mild; lamellae white, then ochraceous; stipe white.......................... *R. integra* (4).
  C. Spore-mass whitish; context acrid, margin very blunt.............. .... Subsect. Emeticinae.
    1. Pileus deep blood-red, almost black at the center, hardly striate on the margin............................ *R. atropurpurea* (5).
    2. Pileus lilac, violet or dark red, short striate on the margin...... .... *R. lilacea* (6).
    3. Pileus rosy, blood-red, then ochraceous or tawny, striate-tuberculate to sulcate on the margin..................... *R. emetica* (7).
    4. Pileus white, margin tuberculate-striate........................ .... *R. fragilis* f. *nivea* (8).
  D. Spore-mass cream or white; margin sharp; taste acrid............. .... Subsect. Foetentinae.
    1. Pileus ochraceous-buff, citron-yellow or yellow-ocher.
      a. Margin tuberculate-striate.

i. Pileus not rugose.
α. Pileus dingy-yellow or ochraceous-buff; stipe whitish or yellowish; odour foetid, taste acrid.............. .... *R. foetens*(9).
β. Pileus warm-buff or light ochraceous-buff; stipe whitish or cream color; odour somewhat foetid, taste acrid... .... *R. subfoetens*(10).
γ. Pileus bright citron-yellow; stipe white; taste mild, odour none .... *R. citrina*(11).
ii. Pileus evidently rugose, especially when young, ochraceous-tawny, then ochraceous-buff; stipe yellowish with dark-brown dots........................... *R. senecis*(12).
b. Margin not striate; pileus yellow or yellow-ocher; stipe white or yellowish; odour none, taste acrid...... *R. ochroleuca*(13).
2. Pileus drab, wood-brown or tawny-olive; stipe white, somewhat sooty at the base; taste almost mild or slightly acrid............ .... *R. sororia*(14).
E. Spore-mass white; taste mild or slightly acrid, margin of pileus sharp. .... Subsect. Cyanoxanthinae.
1. Pileus mixed with purple, pink, olive, green or yellow; lamellae white; stipe white, rarely tinged with pink or lilac; taste mild, odour none.............................. *R. cyanoxantha*(15).
II. Pileus mostly dry, ordinarily intensely colored, pruinose, velvety, asperulate or sometimes areolately cracked; context white, unchanging color.... .... Sect. Rigidae.
A. Spore-mass white to cream; pileus areolately cracked................ .... Subsect. virescentinae.
1. Pileus green or grayish-green; stipe white; taste mild, odour none. .... *R. virescens*(16).
B. Spore-mass white to cream; pileus velvety or pruinose, not evidently cracked... Subsect. Lepidinae
1. Pileus white, then tinged with alutaceous; lamellae white; stipe white.. *R. lactea*(17).
2. Pileus pink to blood-red; lamellae white; stipe white with partly pinkish flush................................ *R. uncialis*(18).
III. Pileus viscid, yellow, brown or white, margin glabrous or pubescent; context white, at length becoming brown or black, more rarely remaining white, frequently becoming reddish on lamellae and also on context by exposure to air.. Sect. Compactae.
A. Context becoming brown, blue, red or black by exposure to the air; taste mild or very frequently slightly acrid, rarely very acrid; pellicle not differentiated......................... Subsect. Nigrescentinae.
1. Pileus white or tinged with smoky-brown, becoming blackish or black; lamellae white, becoming black; stipe white or pallid, at length black................................ *R. nigricans*(19).

B. *Context becoming brick-color or not changing color by exposure to the air;* lamellae ordinarily becoming slightly red, often becoming slightly blue or glaucous-green; pellicle not distinct or clearly breaking up into crusts.. Subsect. Delicinae.

1. Pileus white, then ochraceous; lamellae white; stipe concolorous.. *R. delica* (20).
   a. Lamellae and the apex of the stipe slightly tinged with blue or glaucous-green.................. *R. delica* f. *chloroides* (20b).

Sect. **Constantes** SING.

Hedw. LXVI, 176, 1926.

Pileus variously colored, viscid, not pruinose, not velvety, nor pubescent. Context white, remaining white or becoming yellow.

Subsect. **Chamaeleontinae** SING.

Beih. Bot. Cent. XLIX, 2 Abt. 236, 1932.

Pileus 2–7 cm. broad. Stipe 2–15(–18) mm. thick. Context fragile or very soft, brittle, absolutely mild. Spores ochraceous to saffron-yellow in mass. Margin obtuse.

1. ***Russula olivascens*** PERS. ex FR.

Epicr. Myc. 361, 1838 (non in Monogr. Hymen. Suec. & Hymen. Eur.) —BRES. Icon. Myc. X, pl. 464, 1929—SING. Beih. Bot. Cent. XLIX, 2 Abt. 251, 1932—J. SCHAEFF. Ann. Myc. XXXI, 407, 1933.

Russula olivascens PERS. Obs. Myc. I, 103, 1796 (teste FR.).
Agaricus (*Russula*) *olivascens* PERS. Syn. Fung. 447, 1801 (teste FR.).
Agaricus (*Russula*) *alutaceus* d. *pileo olivaceo* FR. Syst. Myc. I, 55, 1821.
Russula subolivascens BURLINGH. North Amer. Fl. IX, 223, 1915.
Russula alutacea var. *olivascens* REA, Brit. Basid. 475, 1922.
Russula alutacea var. *olivascens* SING. Hedw. LXVI, 189, 1926.

Solitary or rarely gregarious. Pileus 5–10 cm. broad, convex to plane; surface olivaceous or light-olivaceous, yellowish at the center, without pinkish or reddish tint, glabrous, viscid when moist, pellicle separable on the marginal zone, margin even; context white, becoming yellowish when dried, taste mild; lamellae adnate or nearly free, whitish, then becoming cream-color or light ochraceous-buff in

drying, almost equal, rarely forked behind, broader in front, crowded; stipe 4–7 cm. long, 1–1.5 cm. thick, nearly equal or attenuated upward, whitish, nearly smooth, firm, spongy within; spores deep ochraceous in mass, broadly ellipsoidal or subglobose, 7.5–9 × 6–7.5 μ, echinulate.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo), Kitami (Oketo forest).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America.

Jap. name. *Kokeiro-take* (n. n.).

Subsect. **Alutaceinae** M. et Zv. emend. SING.

Beih. Bot. Cent. XLIX, 2 Abt. 236, 1932.

Pileus 4–15 cm. broad. Stipe 8–40 mm. thick. Context elastic, firm, brittle, rather robust, mild or bitter. Spores ochraceous to saffron-yellow in mass. Margin obtuse.

2. *Russula alutacea* PERS. ex FR.

Epicr. Myc. 362, 1838; Hymen. Eur. 453, 1874—BERK. Outl. Brit. Fung. 214, pl. 13, f. 8, 1860—KICKX, Fl. Crypt. Flandr. II, 207, 1867—CKE. Handb. Brit. Fung. I, 225, 1871; Ill. Brit. Fung. pl. 1096, 1890—QUÉL. Champ. Jura Vosg. I, *in Mém. Soc.* D'Emul. *Montb.* 2 sér. V, 213, 1872; Ench. Fung. 137, 1886—GILL. Hymen. Fr. 249, cum icone, 1874—KARST. Hattsv. I, 213, 1879—SACC. Syll. Fung. V, 479, 1887; Fl. Ital. Crypt., Hymen. 416, 1915—MASS. Brit. Fung. Fl. III, 39, 1893—W. G. SM. Brit. Basid. 292, 1908—BURLINGH. North Amer. Fl. IX, 231, 1915—RICKEN, Blätterp. 49, 1915—KAUFFM. Agar. Mich. 150, 1918—REA, Brit. Basid. 474, 1922—SING. Hedw. LXVI, 187, 1926, p. p.; Beih. Bot. Cent. XLIX, 2 Abt. 252, 1932—LANGE, Agar. Denm. VI, 43, 1926—BRES. Icon. Myc. X, pl. 459–461, 1929—CRAWS. Spore Ornam. Russulas, 120, 1930—KILLERM. Pilze Bayern. VI, 35, 1936.

Russula alutacea PERS. Obs. Myc. I, 107, 1796 (teste FR.).

Agaricus (*Russula*) *alutacea* PERS. Syn. Fung. 441, 1801 (teste FR.).

Agaricus (*Russula*) *alutacea* FR. Syst. Myc. I, 55, 1821, p. p.

Russula subalutacea BURLINGH. North Amer. Fl. IX, 229, 1915 (teste J. SCHAEFF.).

Gregarious or solitary, edible. Pileus 4–10 cm. or more broad, globose, then convex to plane, depressed at the center; surface slightly viscid when wet, with somewhat separable pellicle, glabrous, soon dry, pruinose or subgranulose, variable in color: dark reddish-purple, blood-red, sometimes mixed with other shades, margin at first even,

then slightly tuberculato-striate; context white, thick, taste mild, odour none; lamellae attenuato-adnate or nearly free, at first yellowish or ochraceous, soon deep-yellow or deep ochraceous, subdistant, broad, equal; stipe 5–10 cm. long, 1–3 cm. or more thick, equal, white, usually tinged with red, solid; spores ochraceous in mass, subglobose or broadly ellipsoidal, echinulate, $8–10 \times 7–9\,\mu$.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), Asia Minor, Europe, North America, Australia.

Jap. name. *Akane-take* (n. n.).

3. *Russula aurata* [WITH.] FR.

Epicr. Myc. 360, 1838; Hymen. Eur. 452, 1874—BERK. Outl. Brit. Fung. 213, 1860—CKE. Handb. Brit. Fung. I, 224, 1871; Ill. Brit. Fung. pl. 1080, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 212, 1872; Ench. Fung. 136, 1886—GILL. Hymen. Fr. 247, cum icone, 1874—KARST. Hattsv. I, 212, 1879—SACC. Syll. Fung. V, 477, 1887; Fl. Ital. Crypt., Hymen. 428, 1915—MASS. Brit. Fung. Fl. III, 45, 1893—W. G. SM. Brit. Basid. 291, 1908—KAWAMURA, Bot. Mag. (Tokyo), XXII, (380), 1908; Ill. Jap. Fung. pl. 6, f. 4–6, 1913—ROLLAND, Atlas Champ. 43, f. 91, 1910—RICKEN, Blätterp. 48, pl. 17, f. 4, 1915—REA, Brit. Basid. 475, 1922—KONR. et MAUBL. Icon. Sel. Fung. pl. 358, 1924—SING. Hedw. LXVI, 185, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 257, 1932—LANGE, Agar. Denm. VI, 42, 1926—BRES. Icon. Myc. X, pl. 453, 1929—CRAWS. Spore Ornam. Russulas, 119, 1930—J. SCHAEFF. Ann. Myc. XXXI, 406, 1933—KILLERM. Pilze Bayern. VI, 34, 1936.

[SHIRAI, List Jap. Fung. ed. 2, 591, 1917; ed. 3, 346, 1927]

Agaricus auratus WITH. Bot. Arr. Brit. Pl. IV, 184, 1776 (teste FR.).

?*Agaricus esculentus* PERS. Syn. Fung. 350, 1801.

Solitary or gregarious, edible. Pileus 7–11 cm. broad, globose, becoming convex, then plane, finally depressed at the center; surface glabrous, smooth, viscid when wet, varying in color: orange, red or yellow, usually darker at the center, often unicolered a light cadomium to cadomium-yellow, pellicle not separable, margin slightly striate with age; context lemon-yellow, margin thin, taste and odour mild; lamellae free, whitish or yellowish, becoming light ochraceous, vivid lemon-yellow or empire-yellow on the edge, broader in front, equal, very rarely mixed shorter ones, often connected near the stipe; stipe 6–9 cm. long, 1–2 cm. thick, equal or slightly attenuated upward, lemon-yellow, yellow or whitish, glabrous, obsoletely striate

or rugose, stuffed; spores light-ochraceous or ochraceous in mass, subglobose or broadly ellipsoidal, 8–10 × 8–9 μ, echinulate.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe.

Jap. name. *Nishikitake* (KAWAMURA).

Subsect. **Integrinae** SING.

Beih. Bot. Cent. XLIX, 2 Abt. 238, 1932.

Medium to very large sized. Diameter of pileus of small species: length of stipe = 1. General habit of *R. integra* or *R. paludosa*. Absolutely mild or rarely slightly acrid in young lamellae, often bitter. Spores cream or pale ochraceous in mass. Context bitter, not becoming yellow. Margin obtuse. Pellicle glabrous, viscid or dry, often rimose, ordinarily bright or deep red, yellow or brown, without green color.

4. **Russula integra** [L.] FR.

Epicr. Myc. 360, 1838; Hymen. Eur. 450, 1874—BERK. Outl. Brit. Fung. 213, 1860—KICKX, Fl. Crypt. Flandr. II, 206, 1867—CKE. Handb. Brit. Fung. I, 224, 1871; Ill. Brit. Fung. pl. 1093, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 211, 1872; Ench. Fung. 136, 1886—KARST. Hattsv. I, 211, 1879—SACC. Syll. Fung. V, 475, 1887; Fl. Ital. Crypt., Hymen. 424, 1915—MASS. Brit. Fung. Fl. III, 40, 1893—KAWAMURA, Bot. Mag. (Tokyo), XXII, (382), 1908; Ill. Jap. Fung. pl. 8, f. 3–5, 1913—BURLINGH. North Amer. Fl. IX, 228, 1915—KAUFFM. Agar. Mich. 161, 1918—REA, Brit. Basid. 470, 1922—LANGE, Agar. Denm. VI, 48, 1926—SING. Hedw. LXVI, 225, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 278, 1932—BRES. Icon. Myc. IX, pl. 451, 1929—CRAWS. Spore Ornam. Russulas, 122, 1930—KILLERM. Pilze Bayern. 32, pl. 25, f. A, 1936.

[SHIRAI, List Jap. Fung. ed. 2, 591, 1917; ed. 3, 346, 1927]

Agaricus integer L. Sp. Pl. 1171, 1753 (teste FR.).

Ressulina integra SCHROET. Pilze Schles. I, 550, 1889.

Solitary or gregarious, edible. Pileus 5–10 cm. broad, convex, then plane, depressed at the center; surface subviscid when wet, with separable pellicle, glabrous, carmine or dark carmine, margin tuberculato-striate; context white, taste mild, odour none; lamellae nearly free, white at first, then ochraceous, equal, broad, distant; stipe 4–8 cm. long, 1–2 cm. thick, subequal or clavate or ventricose, white,

spongy-stuffed; spores ochraceous in mass, subglobose, echinulate, 8–10 × 8–9 μ.

Hab. on the ground in woods. Summer to early autumn. Kitami (Oketo).

Distr. Japan (Hokkaido, Honshu), Siberia, Europe, North America.

Jap. name. *Yoheiji* (KAWAMURA).

Subsect. **Emeticinae** M. et Zv. emend. SING.

Beih. Bot. Cent. XLIX, 2 Abt. 239, 1932.

Small to large sized. Taste acrid, rarely mild. Margin at first sharp or obtuse, then obtuse. Lamellae pure white, not becoming cream. Spores whitish in mass. Context brittle, unchanging in color or becoming yellow. Pellicle glabrous or velvety, ordinarily viscid, variously colored.

5. ***Russula atropurpurea*** (KROMBH.) R. MAIRE

Bull. Soc. Myc. Fr. XXVI, 167, 1910—KAUFFM. Agar. Mich. 142, 1918—REA, Brit. Basid. 469, 1922—SING. Hedw. LXVI, 218, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 298, 1932—LANGE, Agar. Denm. VI, 42, 1926—CRAWS. Spore Ornam. Russulas, 89, 1930—ZVARA, Bull. Soc. Myc. Fr. XLVII, 44, 1931—J. SCHAEFF. Ann. Myc. XXXI, 450, 1933—KILLERM. Pilze Bayern. VI, 15, 1936.

Agaricus (Russula) atropurpureus KROMBH. Abbild. Schwamm. IX, 6, pl. 64, f. 5–6, 1845 (teste R. MAIRE).

?*Russula purpurea* GILL. Tabl. Anal. Hymen. Fr. 47, 1884—CKE. Ill. Brit. Fung. pl. 1022, 1890.

Russula purpurea KAWAMURA, Bot. Mag. (Tokyo), XXII, (381), 1908; Ill. Jap. Fung. pl. 1, f. 10–13, 1912.

Russula depallens (non FR.) BRES. Icon. Myc. IX, pl. 409, 1929, p. p.

Solitary or gregarious. Pileus 4–10 cm. or more broad, hemispherical, becoming convex, then plane, finally depressed at the center; surface viscid when wet, shiny when dry, Indian-purple or deep blood-red, darker and almost black at the center, paler on the margin, margin thin and hardly striate with age; context white, rather thin, taste mild or slightly acrid; lamellae attenuated-adnate or subdecurrent, white, then slightly yellowish, equal, rather distant; stipe 3–7 cm. long, 8–15 mm. or more thick, equal, white, sometimes

slightly tinged with brown or ochraceous, pruinose above; spores whitish or faintly cream colored, subglobose, echinulate, about $9 \times 8\mu$.

Hab. on the ground in woods. Late summer to autumn. Ishikari (Sapporo, Mt. Kurodake).

Distr. Japan (Hokkaido, Honshu), Siberia, Europe, North America.

Jap. name. *Murasaki-hatsu* (KAWAMURA).

6. *Russula lilacea* QUÉL.

Champ. Jura Vosg. 4 Suppl., in Bull. Soc. Bot. Fr. XXIII, 330, pl. 2, f. 8, 1876; Ench. Fung. 134, 1886—SACC. Syll. Fung. V, 465, 1887—W. G. SM. Brit. Basid. 287, 1908—RICKEN, Blätterp. 45, 1915—REA, Brit. Basid. 462, 1922 —LANGE, Agar. Denm. VI, 33, 1926—J. SCHAEFF. Ann. Myc. XXXI, 360, 1933—KILLERM. Pilze Bayern. VI, 27, 1936.

Russula lilacea var. *carnicola* BRES. Fung. Trid. II, 23, pl. 128, 1892—SACC. Syll. Fung. XI, 30, 1895.

Russula carnicola BRES. (teste J. SCHAEFF) apud REA, Brit. Basid. 477, 1922—LANGE, Agar. Denm. VI, 33, 1926—BRES. Icon. Myc. IX, pl. 429, 1929—CRAWS. Spore Ornam. Russulas, 86, 1930—KILLERM. Pilze Bayern. VI, 27, 1936.

Solitary or somewhat gregarious, edible. Pileus 3–8 cm. broad, convex, then plane, depressed at the center; surface viscid when wet, lilac, violet, or dark-red, sometimes flesh-color, margin at length shortly striate; context white, taste mild, odour none; lamellae free or adnexed, white, forked, subdistant; stipe 3–6 cm. long, 6–15 mm. thick, equal, white or slightly tinged with pink, pruinose at the apex, subrugulose at the base, stuffed; spores white in mass, broadly ellipsoidal or subglobose, echinulate, $7.5\text{–}9 \times 7\text{–}8\mu$.

Hab. on the ground in woods. Summer to autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Usu-murasaki-hatsu* (n. n.).

The writer adopts the fungus in sensu J. SCHAEFFER to the present species.

7. *Russula emetica* [SCHAEFF.] FR.

Epicr. Myc. 357, 1838; Hymen. Eur. 448, 1874—BERK. Outl. Brit. Fung. 212, 1860—CKE. Handb. Brit. Fung. I, 223, 1871; Ill. Brit. Fung. pl. 1030, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 210, 1872

(misspelled as *eintica*); Ench. Fung. 135, 1886—GILL. Hymen. Fr. 243, cum icone, 1874—KARST. Hattsv. I, 209, 1879—SACC. Syll. Fung. V, 469, 1887; Fl. Ital. Crypt., Hymen. 439, 1915—MASS. Brit. Fung. Fl. III, 73, 1893—W. G. SM. Brit. Basid. 289, 1908—ROLLAND, Atlas Champ. 41, f. 84, 1910—KAWAMURA, Ill. Jap. Fung. pl. 1, f. 7–9, 1912—RICKEN, Blätterp. 53, 1915—BURLINGH. North Amer. Fl. IX, 234, 1915—KAUFFM. Agar. Mich. 151, 1918—REA, Brit. Basid. 468, 1922—SING. Hedw. LXVI, 212, 1926, p. p.; Beih. Bot. Cent. XLIX, 2 Abt. 303, 1932, p. p.—LANGE, Agar. Denm. VI, 42, 1926—BRES. Icon. Myc. IX, pl. 435, 1929—CRAWS. Spore Ornam. Russulas, 128, 1930—J. SCHAEFF. Ann. Myc. XXXI, 455, 1933—KILLERM. Pilze Bayern. VI, 26, 1936.

[TANAKA, Mycogr. Nippon. I, No. 1, pt. 1, pl. 2, 1890—P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 172, 1904—SHIRAI, List Jap. Fung. 88, 1905; ed. 2, 591, 1917; ed. 3, 346, 1927—KAWAM. Bot. Mag. (Tokyo), XXII, (381), 1908—YASUDA, Bot. Mag. (Tokyo), XXVIII, (193), 1914—UMEMURA, Pl. Fujiyama. 370, 1923]

Agaricus emeticus SCHAEFF. Fung. Bavar. IV, Ind. 9, pl. 15, f. 4–6, 1774 (teste FR.).

Agaricus (Russula) emeticus FR. Syst. Myc. I, 56, 1821, p. p.

Solitary or gregarious, poisonousness doubtful. Pileus 4–10 cm. broad, convex, then expanded to plane, finally depressed at the center; surface glabrous, viscid, variable in color, rosy, becoming blood-red, then ochraceous or tawny, rarely whitish, margin striate-tuberculate to sulcate; context white, reddish under the separable pellicle, taste very acrid, odour almost none; lamellae free or slightly adnexed, white, equal, subdistant, broad; stipe 4–8 cm. long, 1–2.2 cm. thick, subequal or slightly attenuated upward, white, whitish or reddish, even or rugulose, stuffed; spores whitish or faintly yellowish, globose or subglobose, echinulate, 8–10 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Sapporo, Nopporo, Mt. Kurodake), Oshima (Ônomura), Kitami (Oketo), Kushiro (Akan).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America, Australia, Africa.

Jap. name. *Dokú-beni-take* (TANAKA).

8. ***Russula fragilis*** PERS. ex FR. form. ***nivea*** (PERS. ex CKE.) SING. emend. J. SCHAEFF.

Ann. Myc. XXXI, 461, 1933.

Agaricus (Russula) niveus PERS. Syn. Fung. 438, 1801 (teste CKE.).

Agaricus (Russula) fragilis c. pileo albo FR. Syst. Myc. I, 58, 1821.

Russula fragilis var. *nivea* CKE. Ill. Brit. Fung. pl. 1060, f. B, 1890—MASS. Brit. Fung. Fl. III, 75, 1893—KAWAMURA, Bot. Mag. (Tokyo), XXII, (382), 1908; Ill. Jap. Fung. pl. 1, f. 4–6, 1912—REA, Brit. Basid. 468, 1922—LANGE, Agar. Denm. VI, 31, 1926.

[SHIRAI, List Jap. Fung. ed. 2, 591, 1917; ed. 3, 346, 1927]

Russula subfragilis BURLINGH. North Amer. Fl. IX, 233, 1915, p. p.

Russula emetica subsp. *fragilis* SING. f. *nivea* SING. Hedw. LXVI, 216, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 308, 1932.

Russula fragilis Auct. plur. p. p.

Solitary or gregarious in small groups. Pileus 2–4 cm. broad, convex, then plane, depressed at the center; surface white, slightly viscid when wet, polished, with a separable pellicle, glabrous, margin tuberculato-striate; context white, taste acrid, odour none; lamellae slightly adnexed, pure-white, equal, crowded; stipe 2–4 cm. long, 5–10 mm. thick, equal, white, pruinose, spongy-stuffed; spores white in mass, subglobose, 7–9 × 6–8 μ, echinulate.

Hab. on the ground in woods. Summer to autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Shiro-no-kobenitake* (KAWAMURA).

Subsect. **Foetentinae** M. et ZV. emend. SING.

Beih. Bot. Cent. XLIX, 2 Abt. 239, 1932.

Small to large sized. Taste acrid, rarely disagreeable or mild. Odour of fruit, or of special odour, rarely mild or none. Margin at first somewhat sharp or obtuse, often long pectinate or rimose, glabrous except tomentose margin. Spores whitish or cream in mass. Context brittle or elastic.

9. ***Russula foetens*** [PERS.] FR.

Epicr. Myc. 359, 1838; Hymen. Eur. 447, 1874—BERK. Outl. Brit. Fung. 213, 1860—CKE. Handb. Brit. Fung. I, 222, 1871; Ill. Brit. Fung. pl. 1046, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 209, 1872; Ench. Fung. 135, 1886—GILL. Hymen. Fr. 239, cum icone, 1874—KARST. Hattsv. I, 208, 1879—WINT. Die Pilze, I, 531, 1884—SACC. Syll. Fung. V, 467, 1887; Fl. Ital. Crypt., Hymen., 438, 1915—SCHROET. Pilze Schles. I, 547, 1889—MASS. Brit. Fung. Fl. III, 70, 1893—W. G. SM. Brit. Basid. 288, 1908—ROLLAND,

Atlas Champ. 42, f. 87, 1910—BURLINGH. North Amer. Fl. IX, 214, 1915—RICKEN, Blätterp. 51, pl. 19, f. 4, 1915—KAUFFM. Agar. Mich. 136, pl. 17, 1918—REA, Brit. Basid. 464, 1922—SING. Hedw. LXVI, 207, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 319, 1932—LANGE, Agar. Denm. VI, 34, 1926—BRES. Icon. Myc. IX, pl. 426, 1929—CRAWS. Spore Ornam. Russulas, 139, 1930—J. SCHAEFF. Ann. Myc. XXXI, 434, 1933—KILLERM. Pilze Bayern. VI, 23, 1936.

[UMEMURA, Pl. Fujiyama. 371, 1923—SHIRAI, List Jap. Fung. ed. 3, 346, 1927—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 113, 1931]

Agaricus (*Russula*) *foetens* PERS. Syn. Fung. 443, 1801 (teste FR.).

Agaricus (*Russula*) *foetens* FR. Syst. Myc. I, 59, 1821.

Russula foetentula PK. 116 Bull. N. Y. State Mus. 85, 1907.

Solitary or gregarious, poisonousness doubtful. Pileus 7–12 cm. broad, globose, then expanded and depressed at the center; surface dingy yellow to ochraceous-buff, darker at the center, viscid when wet, margin involute at first, tuberculately striate, pellicle separable only on the marginal zone; context rigid, whitish or yellowish, taste bitter, odour foetid; lamellae remote or free, white, then yellowish, at length dingy with white powders; stipe 5–9 cm. long, 13–20 mm. thick, equal or attenuated downward, whitish or yellowish with cinnamon colored stripes, hollow; spores whitish in mass, globose or subglobose, 7–9 × 6–7 μ or 8 μ in diam., echinulate.

Hab. on the ground in woods. Summer to autumn. Ishikari (Sapporo, Nopporo, Mt. Kurodake), Kushiro (Akan).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe, North America.

Jap. name. *Hekuso-hatsu* (KAWAMURA).

10. *Russula subfoetens* W. G. SM.

Journ. Bot. XI, 337, 1873; Brit. Basid. 288, 1908—CKE. Ill. Brit. Fung. pl. 1047, 1890—REA, Brit. Basid. 466, 1922.

Russula foetens var. *subfoetens* MASS. Brit. Fung. Fl. III, 70, 1893.

Russula fellea (?non FR.) BRES. Icon. Myc. IX, pl. 427, 1929.

?*Russula farinipes* ROM. apud. BRITZ. sensu J. SCHAEFF. Ann. Myc. XXXI, 428, 1933.

Solitary. Pileus 3–10 cm. broad, convex, then plane, depressed at the center; surface viscid when wet, with a separable pellicle, light-buff on the margin, light ochraceous-buff or warm-buff at the center, glabrous, margin tuberculato-sulcate; context white, taste acrid; lamellae adnate, subcrowded or subdistant, white, becoming

yellowish, equal, sometimes forked near the stipe; stipe 5–9 cm. long, 1–2.5 cm. thick, nearly equal or attenuated at the base, white, becoming slightly tinged with cream-color, subpruinose below, subrugose, stuffed then hollow; spores whitish or pale ochraceous in mass, subglobose, echinulate, 7.5–10 × 6.5–7.5 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, ?North America.

Jap. name. *Ko-kusahatsu* (KAWAMURA ex SUZUKI).

11. *Russula citrina* GILL.

Rev. Myc. III, 5, 1881; Tab. Anal. Hymen. Fr. 47, 1884—SACC. Syll. Fung. V, 471, 1887; Fl. Ital. Crypt., Hymen. 437, 1915—CKE. Ill. Brit. Fung. pl. 1078, 1890—MASS. Brit. Fung. Fl. III, 54, 1893—W. G. SM. Brit. Basid. 290, 1908—REA, Brit. Basid. 462, 1922—SING. Hedw. LXVI, 226, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 310, 1932—BRES. Icon. Myc. IX, pl. 438, 1929—KILLERM. Pilze Bayern. VI, 22, 1936.

Solitary or gregarious. Pileus 3–7 cm. or more broad, convex, then expanded, more or less depressed at the center; surface slightly viscid when wet, with a separable pellicle, uniformly bright citron-yellow or more or less isabel-color at the center, and pale honey-yellow on the margin, margin thin, becoming tuberculato-striate with age; context white, taste mild, odour none; lamellae white, slightly decurrent, forked near the stipe, crowded; stipe 4–6 cm. long, 8–15 mm. thick, nearly equal or slightly attenuated upward and at the base, white, sometimes slightly tinged with ochraceous at the base, substriate, stuffed; spores white in mass, broadly ellipsoidal or subglobose, 8.5–10 × 7.5–8.5 μ, echinulate.

Hab. on the ground in woods. Summer to autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido), Europe.

Jap. name. *Natane-hatsu* (n. n.).

12. *Russula senecis* IMAI, sp. nov.

Gregaria vel solitaria. Pileo 4–10 cm. vel ultra lato, subgloboso, dein convexo, demum plano centro depresso, udo viscido, apelliculoso,

primo "ochraceous-tawny", dein "ochraceous-buff" vel "antimony-yellow", cum ruga "ochraceous-tawny-" vel "mars-brown-" colorata, *margine primo astriato demum leviter striatulato*; *carne alba*, *fragile*, crassiuscula, sapore acrissimo, odore valido; lamellis adnatis vel leviter decurrentibus, subaequalibus, subconfertis, albis, acie atrobrunneis; stipite 5–10 cm. longo, 9–15 mm. crasso, aequali, flavidulo vel albido, atrobrunneo-punctato, e farcto cavo; sporis in cumulo albidis, globosis, echinulatis, 8 μ in diam.

Hab. on the ground in woods. Late summer to early autumn. Ishikari (Nopporo).

Distr. Endemic (Hokkaido, Honshu).

Jap. name. *Okina-kusahatsu* (n. n.).

13. *Russula ochroleuca* PERS. ex FR.

Epicr. Myc. 358, 1838; Hymen. Eur. 449, 1874—BERK. Outl. Brit. Fung. 212, 1860—CKE. Handb. Brit. Fung. I, 223, 1871; Ill. Brit. Fung. pl. 1049, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 210, 1872—GILL. Hymen. Fr. 244, cum icone, 1874—KARST. Hattsv. I, 210, 1879—SACC. Syll. Fung. V, 471, 1887; Fl. Ital. Crypt., Hymen. 439, 1915—MASS. Brit. Fung. Fl. III, 68, 1893—W. G. SM. Brit. Basid. 290, 1908—RICKEN, Blätterp. 51, pl. 18, f. 7, 1915—BURLINGH. North Amer. Fl. IX, 218, 1915—REA, Brit. Basid. 465, 1922—SING. Hedw. LXVI, 210, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 311, 1932—BRES. Icon. Myc. IX, pl. 437, 1929—CRAWS. Spore Ornam. Russulas, 131, 1930—KILLERM. Pilze Bayern. VI, 28, 1936.

Russula ochroleuca PERS. Obs. Myc. I, 102, 1796 (teste FR.).

Agaricus (*Russula*) *ochroleuca* PERS. Syn. Fung. 443, 1801 (teste FR.).

Solitary or gregarious. Pileus 4–8 cm. or more broad, convex, then expanded to plane or depressed; surface viscid, yellow or yellow-ocher, slightly darker at the center, becoming paler with age, margin not striate; context white, yellowish under the pellicle, taste acrid, odour none; lamellae attenuato-free or adnexed, broader in front, white, then faintly yellowish, somewhat equal; stipe 3–6 cm. long, 1–1.5 cm. thick, equal or slightly enlarged at the base, white or yellowish at the base, slightly rugulose, stuffed; spores white in mass, globose or subglobose, 8–10 × 7–9 μ, echinulate.

Hab. on the ground in woods. Summer to autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Yamabuki-hatsu* (n. n.).

14. *Russula sororia* FR.

Epicr. Myc. 359, 1838; Hymen. Eur. 447, 1874—SACC. Syll. Fung. V, 466, 1887; Fl. Ital. Crypt., Hymen. 436, 1915—J. SCHAEFF. Ann. Myc. XXXI, 440, 1933.

Russula consobrina var. *sororia* GILL. Hymen. Fr. 238, 1874—SING. Hedw. LXVI, 205, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 317, 1932.

Russula pectinata (non FR.) ROLLAND, Atlas Champ. 39, f. 75, 1910—BURLINGH. North Amer. Fl. IX, 213, 1915—BRES. Icon. Myc. IX, pl. 440, 1929.

Solitary or gregarious. Pileus 3–9 cm. broad, at first subglobose, becoming convex, then plane, depressed at the center; surface viscid when wet, shining when dry, drab, wood-brown or tawny-olive at the center, margin paler and striato-tuberculate; context whitish, rather thin, odour subfarinaceous, taste almost mild or slightly acrid; lamellae attenuato-adnate or nearly free, white, then becoming yellowish, mixed with long and short ones, frequently forked near the stipe, crowded; stipe 3–7 cm. long, 6–15 mm. thick, equal, sometimes attenuated at the base, white, but somewhat sooty at the base, glabrous, stuffed or spongy-stuffed; spores white or faintly yellowish in mass, subglobose or broadly ellipsoidal, 7–9 × 6–8 μ, echinulate.

Hab. on the ground under trees or in woods. Summer to autumn. Ishikari (Sapporo, Nopporo).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Kicha-hatsu* (n. n.).

Subsect. **Cyanoxanthinae** SING.

Beih. Bot. Cent. XLIX, 2 Abt. 240, 1932.

Pileus glabrous or slightly silky, viscid when moist, veined, lilac or green, sharp on the margin. Taste mild or acrid. Spores white in mass. Context elastic, unchanging color, white.

15. *Russula cyanoxantha* [SCHAEFF.] FR.

Monogr. Hymen. Suec. II, 194, 1863; Hymen. Eur. 446, 1874—CKE. Handb. Brit. Fung. I, 222, 1871; Ill. Brit. Fung. pl. 1043, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 208, 1872; Ench. Fung. 135, 1886—GILL. Hymen. Fr. 242, cum icone, 1874—KARST. Hattsv. I, 206, 1879—

SACC. Syll. Fung. V, 465, 1887; Fl. Ital. Crypt., Hymen. 442, 1915—MASS. Brit. Fung. Fl. III, 63, 1893—W. G. SM. Brit. Basid. 287, 1908—RICKEN, Blätterp. 44, pl. 16, f. 1, 1915—KAUFFM. Agar. Mich. 141, 1918—REA, Brit. Basid. 462, 1922 —SING. Hedw. LXVI, 228, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 323, 1932—LANGE, Agar. Denm. VI, 38, 1926—BRES. Icon. Myc. IX, pl. 423, 1929—CRAWS. Spore Ornam. Russulas, 90, 1930—KILLERM. Pilze Bayern. VI, 20, 1936.

Agaricus cyanoxanthus SCHAEFF. Fung. Bavar. IV, Ind. 40, pl. 93, 1774 (teste FR.).

Solitary or gregarious, edible. Pileus 5–10 cm. or more broad, convex, then plane, depressed at the center; surface viscid when wet, variable in color, usually at first lilac-pink, then becoming flushed with purple, pink, olive, blue or green and often with yellow, margin even, not striate; context white, purplish or reddish under pellicle, taste mild, odour none; lamellae attenuato-adnate, white, broad, equal, subcrowded, forked; stipe 4–8 cm. long, 1–2 cm. thick, equal or attenuated at the base, white, rarely tinged with pink or lilac color, spongy-stuffed; spores white in mass, subglobose or broadly ellipsoidal, minutely echinulate, $8\text{–}10 \times 7\text{–}9\ \mu$.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo), Oshima (Ônomura).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America, Africa.

Jap. name. *Kawari-hatsu* (n. n.).

Sect. **Rigidae** FR. emend. SING.

Beih. Bot. Cent. XLIX, 2 Abt. 241, 1932.

Pileus ordinarily intensely colored, not viscid, pruinose, velvety, asperulate, sometimes areolately cracked. Context white, unchanging color.

Subsect. **Virescentinae** SING.

Beih. Bot. Cent. XLIX, 2 Abt. 241, 1932.

Margin at length round. Pileus punctate-squamulose, ordinarily areolately-cracked, white, yellowish, gray, violet or green. Taste mild or slightly acrid. Spores white or cream in mass.

16. *Russula virescens* [SCHAEFF.] FR.

Epicr. Myc. 355, 1838; Hymen. Eur. 443, 1874—BERK. Outl. Brit. Fung. 212, pl. 13, f. 6, 1860—CKE. Handb. Brit. Fung. I, 220, 1871; Ill. Brit. Fung. pl. 1039, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 207, 1872; Ench. Fung. 133, 1886—GILL. Hymen. FR. 234, cum icone, 1874—KARST. Hattsv. I, 204, 1879—SACC. Syll. Fung. V, 460, 1887; Fl. Ital. Crypt., Hymen. 412, 1915—MASS. Brit. Fung. Fl. III, 57, 1893—ATKINS. Mushrooms, ed. 2, 126, pl. 40, f. 1, 1903—W. G. SM. Brit. Basid. 285, 1908—ROLLAND, Atlas Champ. 41, f. 81, 1910—KAWAMURA, Ill. Jap. Fung. pl. 1, f. 14–16, 1912—BURLINGH. North Amer. Fl. IX, 209, 1915—RICKEN, Blätterp. 43, pl. 16, f. 3, 1915—KAUFFM. Agar. Mich. 131, 1918—REA, Brit. Basid. 460, 1922—SING. Hedw. LXVI, 248, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 335, 1932—LANGE, Agar. Denm. VI, 37, 1926—BRES. Icon. Myc. IX, pl. 412, 1929—CRAWS. Spore Ornam. Russulas, 81, 1930—J. SCHAEFF. Ann. Myc. XXXI, 334, 1933—KILLERM. Pilze Bayern. VI, 13, 1936.

[P. HENN. Hedw. XXXIX, (156), 1900—MATSUM. Ind. Pl. Jap. I, 172, 1904—SHIRAI, List Jap. Fung. 89, 1905; ed. 2, 591, 1917; ed. 3, 347, 1927—KAWAMURA, Bot. Mag. (Tokyo), XXII, (379), 1908—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 114, 1931]

Agaricus virescens SCHAEFF. Fung. Bavar. IV, Ind. 40, pl. 94, excl. f. 1, 1774 (teste FR.).

Agaricus (Russula) virescens PERS. Syn. Fung. 447, 1801 (teste FR.).

Agaricus (Russula) furcatus β *heterophyllus* b. FR. Syst. Myc. I, 59, 1821.

Solitary or gregarious, edible. Pileus 5–10 cm. or more broad, globose, becoming convex, then nearly plane, finally depressed at the center; surface green or grayish-green, sometimes tinged with yellowish, pinkish or purplish color, dry, pellicle broken up into floccose patches or warts, center usually paler, not broken up and subvelvety, margin at first not striate and somewhat warted, finally shortly striate and rarely slightly tuberculated; context white, rather brittle, taste mild, odour none; lamellae nearly free or attenuated-adnate, pure white, then slightly tinged with yellowish color, somewhat mixed with short ones, some forking, narrow toward stipe, rather broad, somewhat crowded, rigid; stipe 4–8 cm. or more long, 1–2.5 cm. thick, nearly equal, white, rarely tinged with cream color, glabrous, pruinose, granulose or subflocculose, sometimes subrivulose, solid; spores white in mass, subglobose or broadly ellipsoidal, $7–8 \times 6–7\ \mu$, echinulate.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo, Mt. Kurodake), Iburi (Lake side of Shikotsu), Kushiro (Akan), Kitami (Oketo).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Aitake* (SHIRAI ex P. HENN.).

Subsect. **Lepidinae** M. et Zv. emend. SING.

Beih. Bot. Cent. XLIX, 2 Abt. 242, 1932.

Margin round. Pileus not cracked, white, yellow, brown, cinnamon or violet. Taste mild, often bitter. Spores white to cream in mass.

17. ***Russula lactea*** [PERS.] FR.

Epicr. Myc. 355, 1838; Hymen. Eur. 443, 1874—CKE. Handb. Brit. Fung. I, 220, 1871; Ill. Brit. Fung. pl. 1070, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 207, 1872; Ench. Fung. 133, 1886—GILL. Hymen. Fr. 234, cum icone, 1874—KARST. Hattsv. I, 203, 1879—SACC. Syll. Fung. V, 459, 1887; Fl. Ital. Crypt., Hymen. 412, 1915—MASS. Brit. Fung. Fl. III, 50, 1893—W. G. SM. Brit. Basid. 285, 1908—RICKEN, Blätterp. 41, 1915—BURLINGH. North Amer. Fl. IX, 209, 1915—REA, Brit. Basid. 459, 1922—BRES. Icon. Myc. IX, pl. 411, 1929—CRAWS. Spore Ornam. Russulas, 78, 1930—KILLERM. Pilze Bayern. VI, 12, 1936.

Agaricus (Russula) lacteus PERS. Syn. Fung. 439, 1801 (*teste* FR.).

Russula lepida var. *alba* SING. Hedw. LXVI, 247, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 341, 1933.

Russula lepida f. *lactea* J. SCHAEFF. Ann. Myc. XXXII, 225, 1934.

Gregarious or solitary, edible. Pileus 4–8 cm. broad, convex, then plane, depressed at the center; surface white, then tinged with alutaceous, dry, pruinose, margin even; context white, compact, taste mild, odour none; lamellae attenuato-adnexed or free, white, mixed with a few short ones, subdistant, forked, rather broad, thick, rigid; stipe 3–5 cm. long, 1–1.5 cm. thick, equal or ventricose, subconcolorous, pruinose, rugulose, spongy-stuffed; spores white in mass, subglobose or globose, echinulate, 7.5–10 × 7.5–8 μ, or 7.5–8 μ in diam.

Hab. on the ground in woods. Summer to early autumn. Ishikari (Mt. Kurodake).

Distr. Japan (Hokkado), Europe, North America.

Jap. name. *Yuki-hatsu* (n. n.).

18. *Russula uncialis* PK.

2 Bull. N. Y. State Mus. 10, 1888—MURRILL, Mycologia, IV, 292, pl. 76, f. 6, 1912—BURLINGH. North Amer. Fl. IX, 232, 1915—KAUFFM. Agar. Mich. 160, 1918—J. SCHAEFF. Ann. Myc. XXXI, 354, 1933.

Russula aurora subsp. *uncialis* SING. Beih. Bot. Cent. XLIX, 2 Abt. 343, 1932.

Solitary or gregarious. Pileus 2–6 cm. broad, globose to convex, then plane and depressed at the center; surface viscid when wet, with a separable pellicle, subglabrous or pruinose, pink to blood-red or old blood color, paler on the margin, margin at first even, at length slightly tuberculato-striate; context white, reddish under the pellicle, thin, fragile, taste mild, odour almost none; lamellae free or freely adnate, white, then yellowish, equal but rarely mixed with short ones, some forking near the stipe, broader in front, crowded; stipe 4–6 cm. long, 7–10 mm. thick, equal or attenuated upward or downward, white, with pinkish flush in a part, glabrous, spongy-stuffed or slightly hollow; spores white in mass, subglobose, 7.5 × 6–7 μ, echinulate.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido), North America, Europe.

Jap. name. *Ko-akebono-hatsu* (n. n.).

Sect. **Compactae** FR. emend. SING.

Beih. Bot. Cent. XLIX, 2 Abt. 243, 1932.

Pileus yellow to brown or white, viscid; margin glabrous or pubescent. Context white, at length becoming brown or black, more rarely remaining white, frequently becoming red on lamellae and context changing to red by exposure to air, rarely becoming blue or bay or black. Spores white or cream in mass.

Subsect. **Nigricantinae** M. et ZV. emend. SING.

Beih. Bot. Cent. XLIX, 2 Abt. 243, 1932.

Context ordinarily changing brown, blue, red or black when exposured to air. Lamellae often becoming red or black. Taste mild or very frequently slightly acrid or rarely very acrid. Pellicle not differentiated.

19. *Russula nigricans* [BULL.] FR.

Epicr. Myc. 350, 1838; Hymen. Eur. 439, 1874—BERK. Outl. Brit. Fung. 209, 1860—KICKX, Fl. Crypt. Flandr. II, 203, 1867—CKE. Handb. Brit. Fung. I, 218, 1871; Ill. Brit. Fung. pl. 1015, 1890—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 204, 1872; Ench. Fung. 132, 1886—GILL. Hymen. Fr. 231, cum icone, 1874—KARST. Hattsv. I, 199, 1879—SACC. Syll. Fung. V, 453, 1887; Fl. Ital. Crypt., Hymen. 408, 1915—MASS. Brit. Fung. Fl. III, 51, 1893—W. G. SM. Brit. Basid. 281, 1908—ROLLAND, Atlas Champ. 40, f. 78, 1910—BURLINGH. North Amer. Fl. IX, 206, 1915—RICKEN, Blätterp. 42, pl. 15, f. 2, 1915—KAUFFM. Agar. Mich. 126, 1918—REA, Brit. Basid. 458, 1922—SING. Hedw. LXVI, 256, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 368, 1932—LANGE, Agar. Denm. VI, 26, 1926—BRES. Icon. Myc. VIII, pl. 397, 1928—CRAWS. Spore Ornam. Russulas, 80, 1930—J. SCHAEFF. Ann. Myc. XXXI, 308, 1933—KILLERM. Pilze Bayern. VI, 6, 1936.

[YASUDA, Bot. Mag. (Tokyo), XXXVIII, (76), 1924]

Agaricus nigricans BULL. Champ. Fr. pl. 212 & 579, f. 2, 1791 (teste FR.).

Agaricus (*Russula*) *adustus* FR. Syst. Myc. I, 60, 1821, p. p.

Solitary or gregarious, edible. Pileus 4–15 cm. or more broad, convex and umbilicate, expanded and depressed at the center, finally subinfundibuliform; surface white or tinged with smoky-brown, becoming blackish or black, slightly viscid when wet, glabrous, margin incurved at first, even; context firm, white, slowly changing to reddish where wounded and becoming black, taste mild, odour none; lamellae adnate or adnexed, distant, broad, alternating short and longer ones, rigid, white, becoming reddish where bruised and then blackish; stipe 3–8 cm. long, 1–3 cm. thick, equal, white or pallid, then grayish, at length black, even or sometimes uneven in places, solid; spores white in mass, broadly ellipsoidal or nearly globose. asperulate, 7.5–9 × 6–7 μ.

Hab. on the ground in woods. Summer to early autumn. Ishikari (Nopporo, Mt. Kurodake).

Distr. Japan (Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Kurohatsu* (KAWAMURA), *Kuro-benitake* (YASUDA).

Subsect. **Delicinae** M. et ZV. emend. SING.

Beih. Bot. Cent. XLIX, 2. Abt. 243, 1932.

Context becoming brick-red or not changing color by exposure to air. Lamellae ordinarily becoming red, often becoming slightly

blue or glaucous-green. Pellicle not distinct or clearly breaking up into crusts. Taste mild or acrid.

20. *Russula delica* FR.

Epicr. Myc. 350, 1838; Hymen. Eur. 440, 1874—BERK. Outl. Brit. Fung 210, 1860—*KICKX, Fl. Crypt. Flandr.* II, 204, 1867—CKE. *Handb. Brit. Fung.* I 218, 1871—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V 204, 1872; Ench. Fung. 132, 1886—GILL. Hymen. Fr. 232, cum icone, 1874—KARST. Hattsv. I, 200, 1879—SACC. Syll. Fung. V, 455, 1887; Fl. Ital. Crypt. Hymen. 409, 1915—MASS. Brit. Fung. Fl. III, 53, 1893—W. G. SM. Brit. Basid 282, *1908—BURLINGH. North Amer. Fl. IX, 207, 1915—RICKEN, Blätterp. 41, pl* 15, f. 1, 1915—KAUFFM. Agar. Mich. 125, 1918—REA, Brit. Basid. 457, 1922—SING. Hedw. LXVI, 253, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 369, 1932—LANGE Agar. Denm. VI, 28, 1926—BRES. Icon. Myc. IX, pl. 401, 1929—CRAWS. Spore Ornam. Russulas, 79, 1930—J. SCHAEFF. Ann. Myc. XXXI, 314, 1933—KILLERM Pilze Bayern. VI, 7, 1936.

[MATSUURA, Trans. Tottori Soc. Agr. Sci. IV, 99, 1932]

Russula deliciosa SCHROET. Pilze Schles. I, 549, 1889.

Russula brevipes PK. 54 Ann. Rep. N. Y. State Mus. 178, 1901 (teste BURLINGH.).

Solitary or gregarious, edible. Pileus 8–18 cm. broad, broadly convex-umbilicate, then expanded to subinfundibuliform; surface white, then pallid, yellowish or ochraceous, easily stained yellowish or ochraceous when dried, dry, glabrous, subglabrous or obscurely tomentose, areolately cracked in dry weather, pellicle not separable context white, unchanging color, firm, brittle, taste not acrid; lamellae attenuated-adnate or subadnexed, broad, crowded, white, becoming pallid, yellowish or brownish, nearly alternating long and short ones slightly forking near the stipe; stipe 2–5 cm. long, 1.5–3 cm. thick, equal or slightly attenuated at the base, white or concolorous, glabrous or slightly powdery, solid; spores white in mass, subglobose or globose, spinulate, 7.5–10 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo), Nemuro (Ochiishi).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe, North America.

Forma *chloroides* (KROMBH.) IMAI, comb. nov.

Agaricus chloroides KROMBH. Abbild. Schwamm. VIII, 7, pl. 56, f. 8–9, 1843 (teste BRES.).

Russula chloroides BRES. Fung. Trid. II, 89, pl. 202, 1900; Icon. Myc. IX, pl. 402, 1929—SACC. Fl. Ital. Crypt., Hymen. 410, 1915—REA, Brit. Basid. 458, 1922.

Russula delica var. *glaucophylla* QUÉL. Champ. Jura Vosg. 22 Suppl., in Compt. Rend. Assoc. Fr. Avanc. XXX, 495, pl. 3, f. 7, 1902—SING. Hedw. LXVI, 254, 1926; Beih. Bot. Cent. XLIX, 2 Abt. 370, 1932.

Russula delica var. *chloroides* KILLERM. Pilze Bayern. VI, 7, 1936.

A specie typo differt lamellis et apice stipitis aeruginascentibus.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo), Iburi (Lake side of Shikotsu), Kitami (Oketo), Kushiro (Akan).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Aiba-shirohatsu* (n. n.).

Subfam. Cantharelloideae IMAI, nom. nov.

Cantharellaceae REA, Brit. Basid. 540, 1922, p. p.

Fructificatio carnosa vel carnoso-coriacea, floccosa, sine velis. Hymenium inseparabile, venosum vel plicatum angustum obtusumque, simplex vel furcatum.

Key to the genera.

I. Spores white or pale ochraceous in mass, smooth.
  A. Fructification fleshy or fleshy-coriaceous, stipitate.
    1. Lamellae forked.................................. *Cantharellus.*

II. Spores ochraceous in mass, verruculose; fructification fleshy-coriaceous, stipitate; hymenium fold-like............................ *Neurophyllum.*

Cantharellus [ADANS.] FR.

Syst. Myc. I, 316, 1821.

Chanterel ADANS. Fam. Pl. II, 11, 1763 (sec. EARLE, ac MURRILL).
Merulius HALL. Hist. Stirp. Helv. III, 150, 1768, p. p.
Turbinellus EARLE, Bull. N. Y. Bot. Gard. V, 407, 1909.
Alectorolophoides EARLE, Ibid. 407, 1909.

Pileus fleshy, regular, excentric or lobed. Stipe central, confluent with the pileus. Lamellae decurrent, thick, branched. Spores white, rarely pale ochraceous in mass, smooth.

Type species: *Cantharellus cibarius* FR.

Key to the sections and species in Hokkaido.

I. Pileus regular and entire; stipe central.................. Sect. Mesopus.
  A. *Pileus and stipe fleshy, solid.*
    1. Pileus 3–8 cm. broad, ochraceous-orange.......... *C. cibarius* (1).
    2. Pileus 1.5–2 cm. broad, orange to ochraceous, glabrous.. *C. minor* (2).
  B. Pileus submembranous, stipe tubular, polished.
    1. Pileus umbilicate or infundibuliform.
      a. Pileus yellowish-cinereous or fuliginous; lamellae and stipe yellowish.......................... *C. infundibuliformis* (3).
      b. Pileus fuscous-fuliginous; lamellae and stipe cinereous or fuscous-cinereous........................... *C. cinereus* (4).
    2. Pileus trumpet-shaped or deeply infundibuliform, bright yellow with tawny scales; lamellae yellowish to cream color.... *C. floccosus* (5).

II. Pileus dimidiate, stipe lateral.......................... Sect. Pleuropus.
  A. Fructification white, then yellowish.................. *C. pallidus* (6).

Sect. Mesopus FR.

Epicr. Myc. 364, 1838.

Pileus regular and entire. Stipe central.

1. *Cantharellus cibarius* FR.

Syst. Myc. I, 318, 1821; Epicr. Myc. 365, 1838; Hymen. Eur. 455, 1874—BERK. in SMITH, Engl. Fl. V, (2), 125, 1836; Outl. Brit. Fung. 215, 1860—RABENH. Deut. Krypt. Fl. I, 446, 1844—BARLA, Champ. Nice, 55, pl. 28, f. 7–15, 1859—KICKX, Fl. Crypt. Flandr. II, 207, 1867—CORDA, Champ. Fr. II, 130, pl. 32, f. 1, 1870—CKE. Handb. Brit. Fung. I, 227, 1871; Ill. Brit. Fung. pl. 1103, 1889; Handb. Austr. Fung. 80, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 215, 1872; Ench. Fung. 138, 1886—GILL. Hymen. Fr. 352, cum icone, 1874—KARST. Hattsv. I, 238, 1879—WINT. Die Pilze, I, 523, 1884—SACC. Syll. Fung. V, 482, 1887—SCHROET. Pilze Schles. I, 510, 1888—MASS. Brit. Fung. Fl. II, 319, 1893—ATKINS. Mushrooms, ed. 2, 128, f. 126, 1903—W. G. SM. Brit. Basid. 294, 1908—KAWAMURA, Bot. Mag. (Tokyo), XXII, (412), 1 fig. 1908; Ill. Jap. Fung. pl. 3, f. 8–11, 1912—ROLLAND, Atlas Champ. 52, f. 115–116, 1910—RICKEN, Blätterp. 2, pl. 1, f. 2, 1915—KAUFFM. Agar. Mich.

35, f. 3, 1918—REA, Brit. Basid. 542, 1922—BRES. Icon. Myc. X, pl. 471, 1929—LANGE, Agr. Denm. XI, 40, 1936.

[P. HENN. Hedw. XXXIX, (155), 1900—MATSUM. Ind. Pl. Jap. I, 133, 1904—SHIRAI, List Jap. Fung. 17, 1905; ed. 2, 107, 1917; ed. 3, 62, 1927—YASUDA, Bot. Mag. (Tokyo), XXXI, (171), 1917—UMEMURA, Pl. Fujiyama. 367, 1923]

Agaricus Chantharellus L. Sp. Pl. 1171, 1753—SOW. Engl. Fung. pl. 46, 1797 (*teste* FR.).

Merulius Cantharellus SCOP. Fl. Carn. ed. 2, II, 461, 1772 (teste FR.).

Cantharellus edulis PERS. Tent. Disp. Fung. 26, 1797 (teste SACC.).

Merulius cantharellus PERS. Syn. Fung. 488, 1801.

Alectorolophoides cibarius EARLE, Bull. N. Y. Bot. Gard. V, 407, 1909.

Chanterel Chantharellus MURRILL, North Amer. Fl. IX, 169, 1910.

Cantharellus edulis PERS. ex SACC. Fl. Ital. Crypt., Hymen. 456, 1915.

Gregarious or solitary, rarely cespitose, edible. Pileus 3–8 cm. broad, convex, turbinate, then nearly plane, or somewhat depressed, repand, margin involute and often lobed, then slightly revolute; surface almost glabrous, ochraceous-orange, whitish or pale-orange-yellow at the center; context yellowish, becoming whitish when drying, firm, taste and odour almost none; lamellae decurrent, fold-like, thick, distant, branched, often anastomosing, pale-orange-yellow to capusine-orange; stipe 2.5–9 cm. long, 5–20 mm. thick, equal or slightly attenuated upward or downward, concolorous or slightly paler, glabrous, or subtomentose at the base, solid; spores white or faintly ochraceous in mass, ellipsoidal, $7.5–9 \times 6\ \mu$.

Hab. on the ground in woods. Summer to autumn. Ishikari (Mt. Teine, Nopporo), Iburi (Lake side of Shikotsu), Tokachi (Mt. Nupkaushinupri), Kushiro (Mt. Meakan).

Distr. Japan (Hokkaido, Honshu), China, Asia Minor, Europe, North America, Australia.

Jap. name. *Komo-take* (SHIRAI ex P. HENN.), *Anzutake* (KAWAMURA).

2. *Cantharellus minor* PK.

23 Ann. Rep. N. Y. State Cab. 122, 1872—SACC. Syll. Fung. V, 483, 1887—KAWAMURA, Ill. Jap. Fung. pl. 1, f. 17–19, 1912.

[KAWAMURA, Bot. Mag. (Tokyo), XXIII, (465), 1909—SHIRAI, List Jap. Fung. ed. 2, 109, 1917; ed. 3, 62, 1927—LLOYD, Myc. Writ. V, Letter No. 65, p. 6, 1917—YASUDA, Bot. Mag. (Tokyo), XXXI, (330), 1917]

Chanterel minor MURRILL, North Amer. Fl. IX, 169, 1910.

Solitary or gregarious. Pileus 1.5–2 cm. broad, convex to expanded, irregular or depressed in the center; surface glabrous, orange to ochraceous, margin inrolled, then slightly revoluted, entire or repand; context thin, pallid, fleshy, taste mild; lamellae decurrent, subcrowded, very narrow, often forked, never anastomosed, concolorous; stipe 2–3 cm. long, 2–3 mm. thick, slender, cylindric, attenuated downward or sometimes equal, smooth, orange to yellow; spores yellowish in mass, ellipsoidal or subobovate, ventricose, 7.0–7.5 × 4.5 μ.

Hab. on the ground in woods. Summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), North America.

Jap. name. *Ko-anzutake* (KAWAMURA), *Hime-anzutake* (YASUDA).

3. *Cantharellus infundibuliformis* [SCOP.] FR.

Epicr. Myc. 366, 1838; *Monogr. Hymen. Suec.* II, 208, 1863; *Hymen. Eur.* 458, 1874—RABENH. Deut. Krypt. Fl. I, 445, 1844—BERK. Outl. Brit. Fung. 216, 1860—CKE. Handb. Brit. Fung. I, 229, 1871; Ill. Brit. Fung. pl. 1109, 1890—QUÉL. Champ. Jura Vosg. in Mém. Soc. D'Emul. Montb. 2 sér. V, 216, 1872; Ench. Fung. 139, 1886—GILL. Hymen. Fr. 354, 1874—KARST. Hattsv. I, 240, 1879—WINT. Die Pilze, I, 521, 1884—SACC. Syll. Fung. V, 490, 1887; Fl. Ital. Crypt., Hymen. 450, 1915—SCHROET. *Pilze Schles.* I, 509, 1888—MASS. Brit. Fung. Fl. II, 324, 1893—PK. *Mem. N. Y. State Mus.* III, 158, pl. 56, f. 9–16, 1900—W. G. SM. Brit. Basid. 296, 1908—RICKEN, Blätterp. 3, pl. 1, f. 4, 1915—KAUFFM. Agar. Mich. 37, 1918—REA, Brit. Basid. 544, 1922—BRES. Icon. Myc. X, pl. 478, 1929.

[IMAZEKI, Journ. Jap. Bot. XI, 290, f. 1, 1935]

Merulius infundibuliformis SCOP. Fl. Carn. ed. 2, II, 462, 1772 (teste FR.).

Agaricus cantharelloides SOW. Engl. Fung. pl. 47, 1797 (teste FR.).

Merulius lutescens PERS. Syn. Fung. 489, 1801.

Chanterel infundibuliformis MURRILL, North Amer. Fl. IX, 168, 1910, p. p.

Gregarious or solitary, edible. Pileus 2–5 cm. broad, submembranous, umbilicate then infundibuliform; surface yellowish-cinereous or fuliginous when moist, becoming pale when dry, rugose, fibrillose; lamellae yellowish, then pruinose and gray, fold-like, decurrent, thick, distant, branched, anastomosing; stipe 4–8 cm. long, 4–6 mm. thick, light yellow, base somewhat thickened; spores white in mass, globose or subglobose, 9–11 × 7.5–9 μ, smooth.

Hab. on the ground in woods. Autumn. Kushiro (Lake side of Akan), Southern Saghalien (Mt. Kashipo).

Distr. Japan (Saghalien, Hokkaido, Honshu), Asia Minor, Europe, North America.

Jap. name. *Mikiirousutake* (IMAZEKI).

4. *Cantharellus cinereus* [PERS.] FR.

Syst. Myc. I, 320, 1821; Epicr. Myc. 366, 1838; Monogr. Hymen. Suec. II, 206, 1863; Hymen. Eur. 458, 1874—BERK. in SMITH, Engl. Fl. V, (2), 126, 1836; Outl. Brit. Fung. 216, 1860—RABENH. Deut. Krypt. Fl. I, 445, 1844—KICKX, Fl. Crypt. Flandr. II, 208, 1867—CKE. Handb. Brit. Fung. I, 229, 1871; Ill. Brit. Fung. pl. 1110, f. A, 1888; Handb. Austr. Fung. 81, 1892—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 216, 1872; Ench. Fung. 138, 1886—GILL. Hymen. Fr. 353, cum icone, 1874—KARST. Hattsv. I, 240, 1879—WINT. Die Pilze, I, 521, 1884—SACC. Syll. Fung. V, 490, 1887—MASS. Brit. Fung. Fl. II, 324, 1893—W. G. SM. Brit. Basid. 297, 1908—RICKEN, Blätterp. 4, pl. 1, f. 6, 1915—REA, Brit. Basid. 544, 1922—BRES. Icon. Myc. X, pl. 480, 1929—LANGE, Agar. Denm. XI, 41, 1936.

Helvella hydrolips BULL. Champ. Fr. pl. 465, f. 2, 1791 (teste FR.).

Merulius cinereus PERS. Icon. Descr. Fung. I, 10, pl. 3, f. 3, 1798; Syn. Fung. 490, 1801 (teste FR.).

Cantharellus hydrolips SCHROET. Pilze Schles. I, 509, 1888—SACC. Fl. Ital. Crypt., Hymen. 449, 1915.

Chanterel infundibuliformis MURRILL, North Amer. Fl. IX, 168, 1910, p. p.

Gregarious or somewhat caespitose. Pileus 2–5 cm. broad, submembranous, convex-infundibuliform, often pervious to the base of the stipe; surface villose-squamulose, fuscous-fuliginous, becoming whitish; context concolorous, odour and taste mild; lamellae thick, *fold-like, often reticulate, at first cinereous, then whitish, pruinose, decurrent, distant; stipe* 3–8 cm. *long,* 4–8 *mm. thick, attenuated* downward, curved, glabrous, lacunose, fuscous-cinereous, nearly blackish, hollow; spores white in mass, ellipsoidal, 8–10 × 5–6 μ.

Hab. on the ground in woods. Autumn. Ishikari (Jôzankei), Kushiro (Lake side of Akan).

Distr. Japan (Hokkaido), Europe, North America.

Jap. name. *Akuiro-usutake* (n. n.).

5. *Cantharellus floccosus* SCHW.

Trans. Amer. Phil. Soc. 2, IV, 153, 1832—SACC. Syll. Fung. V, 491, 1887—PK. Mem. N. Y. State Mus. III, 156, pl. 55, f. 9–13, 1900—KAWAMURA, Ill. Jap. Fung. pl. 3, f. 23–25, 1912—KAUFFM. Agar. Mich. 34, 1918—BRES. Icon. Myc. X, pl. 475, 1929.

[LLOYD, Myc. Writ. IV, Letter, No. 47, p. 9, 1913; Myc. Notes, No. 72, p. 1296, 1924; Ibid. 75, p. 1357, f. 3202, 1925—YASUDA, Bot. Mag. (Tokyo), XXIX, (169), 1915—SHIRAI, List Jap. Fung. ed. 2, 109, 1917; ed. 3, 62, 1927—UMEMURA, Pl. Fujiyama. 367, 1923—MATSUURA & KANADA, Trans. Tottori Soc. Agr. Sci. III, 113, 1931]

Turbinellus floccosus EARLE, Bull. N. Y. Bot. Gard. V, 407, 1909.

Chanterel floccosus MURRILL, North Amer. Fl. IX, 168, 1910.

Solitary or gregarious, rarely somewhat caespitose, edible. Pileus 4–12 cm. broad, 7–16 cm. high, subcylindrical or horn shaped in younger stage, then elongated, trumpet-shaped to funnel-shaped, at length becoming deep infundibuliform; surface floccose when young, bright yellow with ocher to tawny spots, becoming darker in age, margin inrolled at first, undulate, often lobed; context white, rather thin, fleshy, rather soft, taste mild, odour none; lamellae decurrent, irregularly distant, 2–4-branched and anastomosing, thick, narrow, fold-like, yellowish to cream color with pruinescence; stipe short, red, pinkish, ochraceous, white or grayish with pruinescence; spores yellow in mass, ellipsoidal, 12–15 × 6.5–8 μ, smooth.

Hab. on the ground in woods, especially of *Abies*. Summer to autumn. Ishikari (Nopporo, Mt. Kurodake), Iburi (Lake side of Shikotsu), Kushiro (Akan).

Distr. Japan (Hokkaido, Honshu), North America, Europe.

Jap. name. *Usu-take* (KAWAMURA).

Sect. **Pleuropus** FR.

Epicr. Myc. 368, 1838.

Pileus dimidiate. Stipe exactly lateral.

6. ***Cantharellus pallidus*** LLOYD

Myc. Notes, No. 47, 661, f. 949, 1917—YASUDA, Bot. Mag. (Tokyo), XXXII, (49), 1918—SACC. Syll. Fung. XXIII, 142, 1925—IMAZEKI, Journ. Jap. Bot. XI, 292, f. 2–3, 1935.

[LLOYD, Myc. Writ. V, Letter No. 65, p. 6, 1917—SHIRAI, List Jap. Fung. ed. 3, 62, 1927]

Gregarious or caespitose, edible. Pileus 4–9 cm. high, turbinate, *funnel-shaped with reflexed sides, subinfundibuliform, irregular*, pleuropodial, spathulate, lobate or branched; surface white or

whitish when fresh, when dried becoming brownish, hymenium white when fresh and young, then becoming yellow, with obtuse, narrow folds or lamellae; stipe irregular in length, usually radicate, white or whitish, discolored when dry; spores yellow or pale ochraceous in mass, ellipsoidal, 8–12 × 4–5.5 μ, smooth.

Hab. on the ground among fallen leaves, mostly in frondose woods. Autumn. Oshima (Ônomura).

Distr. Japan (Honshu, Hokkaido).

Jap. name. *Shiro-anzutake* (YASUDA).

Neurophyllum PAT.

Hymen. Eur. *129, 1887.*

Pileus fleshy-coriaceous, turbinate, clavate or excentric. Stipe central or excentric, rarely lateral, confluent with the pileus. Hymenium fold-like, thick, decurrent, reticulate or anastomosing. Spores ochraceous in mass, verrucose.

Type species: *Craterellus clavatus* FR.

Neurophyllum clavatum (PERS. ex FR.) PAT.

Hymen. Eur. 129, 1887—REA, *Brit. Basid. 548, 1922.*

Elvela carnea SCHAEFF. Fung. Bavar. IV, Ind. 106, pl. 164, 1774 (teste FR.).

Clavaria truncata SCHMID. Icon. Pl. ed. 2, pl. 60, 1793–97 (teste FR.).

Merulius clavatus PERS. Obs. Myc. I, 22, 1796; Syn. Fung. 498, 1801 (teste FR.).

Cantharellus clavatus FR. Syst. Myc. I, 322, 1821—HARPER, Mycologia, V, 261, pl. 93–94, 1913—RICKEN, Blätterp. 1, pl. 1, f. 1, 1915—KAUFFM. Agar. Mich. 34, pl. 2, 1918—BRES. Icon. Myc. X, pl. 482, 1929.

Gomphus truncatus PERS. Myc. Eur. II, 9, 1825.

Craterellus clavatus FR. Epicr. Myc. 533, 1838; Hymen. Eur. 632, 1874—RABENH. Deut. Krypt. Fl. I, 399, 1844—CORDA, Champ. Fr. II, 173, pl. 45, f. 2, 1870—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 299, 1872; Ench. Fung. 201, 1886—GILL. Hymen. Fr. 741, 1874—KARST. Hattsv. II, 120, 1882—WINT. Die Pilze, I, 351, 1884—SACC. Syll. Fung. VI, 519, 1888—SCHROET. Pilze Schles. I, 437, 1888—MASS. Brit. Fung. Fl. I, 137, 1892—W. G. SM. Brit. Basid. 398, 1908—ROLLAND, Atlas Champ. 54, f. 114, 1910.

[YASUDA, Bot. Mag. (Tokyo), XXII, (372), 1908—SHIRAI, List Jap. Fung. ed. 2, 177, 1917; ed. 3, 105, 1927]

Craterellus carneus SACC. Fl. Ital. Crypt., Hymen. 1135, 1916.

Solitary or gregarious, edible. Pileus 3–10 cm. broad, turbinate, truncate or depressed, flexuose, attenuated into the solid stipe; surface fawn-color or army-brown, lilac or rose color, then flesh color, finally ochraceous; lamellae fold-like, thick, reticulated, anastomosing, decurrent. cinnamon-drab or brownish-drab; stipe 1–5 cm. long, 1–3 cm. thick, obconic, whitish, lilac or amethyst, then pale, occasionally branched; spores ochraceous in mass, ellipsoidal or fusiform, 10–12.5 × 4–5 μ, verruculose.

Hab. on the ground in woods. Late summer to autumn. Ishikari (Nopporo).

Distr. Japan (Hokkaido, Honshu), Europe, North America.

Jap. name. *Rappa-take* (YASUDA).

Conclusion

1. The present paper was intended to report the results of the writer's fifteen years study on the taxonomy of the agarics in Hokkaido.

2. Three hundred and forty eight species including seven forms of Agaricaceae have been enumerated in this paper among which forty species and three forms are new to science. They have been classified into six subfamilies, twenty one tribes and fifty one genera.

3. The new species and forms described in the present study are as follows:—

Agaricus comptulellus IMAI
Agaricus jezoensis IMAI
Agaricus semotellus IMAI
Amanita flavipes IMAI
Amanita longistriata IMAI
Amanita pulchella IMAI
Amanita sepiacea IMAI
Amanita spissacea IMAI
Amanita subjunquillea IMAI
Amanitopsis avellaneosquamosa IMAI
Amanitopsis clarisquamosa IMAI
Armillaria Matsutake S. ITO et IMAI
Clitocybe fallax IMAI
Crepidotus longistriata IMAI
Crepidotus terrestris IMAI
Crepidotus viticolus IMAI
Entoloma subnitidum IMAI
Hebeloma fimicolum IMAI
Hebeloma helvolescens IMAI
Hebeloma humosum IMAI
Hebeloma Tomoeae IMAI
Hygrophorus carnescens IMAI
Hygrophorus subniveus IMAI
Laccaria laccata f. *minuta* IMAI
Laccaria murina IMAI
Lactarius akanensis IMAI
Lactarius avellaneus IMAI
Lactarius deliciosus f. *laeticolorus* IMAI
Lactarius deliciosus f. *virescens* IMAI
Lactarius flavidulus IMAI
Lactarius Sakamotoi IMAI
Lepiota ossaeiformispora IMAI
Lepiota subamanitiformis IMAI
Lepiota subglischra IMAI

Leptonia umbrinella IMAI
Pluteus bulbosus IMAI
Pluteus marcosporus IMAI
Psathyra microspora IMAI
Psathyra multissima IMAI
Russula senecis IMAI
Stropharia bulbosa IMAI
Stropharia venenata IMAI
Tricholoma porphyrophyllum IMAI

4. Among these three hundred and forty eight kinds of agarics, two hundred and thirty three species are distributed over both Europe and North America, forty nine species over Europe only and twenty three species over North America only, white forty three species are endemic or eastern Asiatic.

5. A considerable number of fungi in our district are intermediate forms between the European and North American species. This may be of interest from the plant geographical point of view.

6. The species new to Japan are one hundred and ninty six with one form. The plants having newly combined scientific names are eighteen species and three forms, and one species was given a new scientific name.

7. The species having the scientific names of new combination are as follows:—

Agaricus hortensis (CKE.) IMAI
Amanitopsis albida (FR.) IMAI
Armillaria japonica (KAWAM.) IMAI
Clitocybe extenuata (FR.) IMAI
Clitocybe nebularis (BATSCH ex FR.) QUÉL. f. *alba* (LANGE) IMAI
Cortinellus edodes (BERK.) S. ITO et IMAI
Cortinellus squarrulosus (BRES.) IMAI
Galerula campanulata (FR.) IMAI
Gomphidius rutilus (FR.) IMAI
Gymnopilus astragalinus (FR.) IMAI
Gymnopilus lubricus (FR.) IMAI
Hebeloma fastibile (PERS. ex FR.) IMAI
Hypholoma stipatum (FR.) IMAI
Lactarius piperatus [SCOP.] FR. f. *pergamenus* (SWARTZ ex FR.) IMAI
Pholiota Arrhenii (FR.) IMAI
Pholiota Nameko (T. ITO) S. ITO et IMAI
Pholiota togularis (FR.) IMAI
Rhodotus subpalmatus (FR.) IMAI
Russula delica FR. f. *chloroides* (KROMBH.) IMAI
Stropharia aurantiaca (CKE.) IMAI
Tricholoma humosum (FR.) IMAI

The new name *Panaeolus Linnaeanus* IMAI was proposed instead of *P. campanulatus* (L. ex FR.) QUÉL.

8. The newly proposed names are six in subfamilies, fifteen in tribes, fifteen in subgenera, nine in sections and four in subsections.

Subfamilies are Amanitoideae, Volvarioideae, Pholiotoideae, Agaricoideae, Lactarioideae and Cantharelloideae. Tribes are Armillarieae, Tricholomateae, Pleuroteae, Collybieae, Lentineae, Volvarieae, Entolomateae, Claudopeae, Leptonieae, Pholioteae, Cortinarieae,

ℓhodoteae, Crepidoteae, Naucorieae, and Agariceae. Subgenera are ;ystoderma and Limacella in *Lepiota*, Verarmillaria and Mucidula n *Armillaria*, Melaleuca, Rhodopaxillus and Micromphale in *Tri-holoma*, Euclitocybe and Lepista in *Clitocybe*, Concharia and ᴾhyllotus in *Pleurotus*, Euinocybe and Astrosporina in *Inocybe*, /eripaxillus and Tapinia in *Paxillus*. Sections are Limacina, Rigida .nd Guttata in *Tricholoma*, Fibrillosi, Pruinosi, and Nudi in *Pluteus*, /iscigomphus and Floccigomphus in *Gomphidius*, Pruinatipedes in ᴾ*sathyrella*. Subsections are Squamosae in *Pholiota*, Viscidi, Impoliti ınd Glabrati in *Lactarius*.

9. So far as the writer is aware, the edible agarics in Hokkaido omprise one hundred and eighty one species and four forms. Among hem, the fungi suitable for market are seventy four species and two 'orms.

Edible fungi suitable for market are as follows:—

1garicus arvensis SCHAEFF. ex FR.
1garicus campestris L. ex FR.
1garicus hortensis (CKE.) IMAI
1garicus placomyces PK.
1garicus silvaticus SCHAEFF. ex FR.
1garicus silvicola (VITT.) SACC.
1garicus subrufescens PK.
1rmillaria caligata (VIV.) GILL.
1rmillaria Matsutake S. ITO et IMAI
1rmillaria mellea (VAHL ex FR.) QUÉL.
1rmillaria ventricosa PK.
;antharellus cibarius FR.
;antharellus floccosus SCHW.
;litocybe extenuata (FR.) IMAI
;litocybe nebularis (BATSCH ex FR.) QUÉL.
;litopilus caespitosus PK.
;ollybia butyracea (BULL. ex FR.) QUÉL.
;ollybia velutipes (CURT. ex FR.) QUÉL.
'ortinarius elatus (PERS. ex FR.) SACC.
'ortinarius fulgens [ALB. et SCHW.] FR.
'ortinarius latus [PERS.] FR.
'ortinarius multiformis FR.
Cortinellus edodes (BERK.) S. ITO et IMAI
Cortinellus scalpturatus (FR.) KARST.
Cortinellus vaccinus (SCHAEFF. ex FR.) ROZE
Entoloma clypeatum (L. ex FR.) QUÉL.
Gomphidius rutilus (SCHAEFF. ex FR.) IMAI
Gymnopilus lentus (PERS. ex FR.) MURRILL
Gymnopilus lubricus (FR.) IMAI
Hebeloma mesophaeum (PERS. ex FR.) QUÉL.
Hygrophorus chrysodon [BATSCH] FR.
Hygrophorus erubescens FR.
Hygrophorus pudorinus FR.
Hypholoma lateritium (SCHAEFF. ex FR.) SCHROET.
Lactarius deliciosus [L.] FR. f. *laeticolorus* IMAI
Lactarius deliciosus [L.] FR. f. *virescens* IMAI
Lactarius flavidulus IMAI
Lactarius luteolus PK.
Lactarius piperatus [SCOP.] FR.
Lactarius piperatus [SCOP.] FR. f. *pergamenus* (SWARTZ ex FR.) IMAI

Lactarius sanguifluus [PAUL.] FR.
Lactarius torminosus [SCHAEFF.] FR.
Lactarius vellereus FR.
Lactarius volemus FR.
Lepiota naucina (FR.) QUÉL.
Marasmius oreades [BOLT.] FR.
Pholiota adiposa (FR.) QUÉL.
Pholiota erebia (FR.) GILL.
Pholiota Nameko (T. ITO) S. ITO et IMAI
Pholiota praecox (PERS. ex FR.) QUÉL.
Pholiota squarrosa (MUELL. ex FR.) QUÉL.
Pholiota squarrosoides (PK.) SACC.
Pholiota terrestris OVERH.
Pholiota togularis (FR.) IMAI
Pholiota Vahlii (SCHUM. ex FR.) LANGE
Pleurotus cornucopiae (PAUL. ex PERS.) ROLLAND
Pleurotus ostreatus (JACQ. ex FR.) QUÉL.
Pleurotus porrigens (PERS. ex FR.) GILL.
Pleurotus serotinus (PERS. ex FR.) GILL.
Russula aurata [WITH.] FR.
Russula cyanoxantha [SCHAEFF.] FR.
Russula delica FR.
Russula delica FR. f. *chloroides* (KROMBH.) IMAI
Russula integra [L.] FR.
Russula lactea [PERS.] FR.
Russula virescens [SCHAEFF.] FR.
Tricholoma albobrunneum (PERS. ex FR.) QUÉL.
Tricholoma cartilagineum (FR.) QUÉL.
Tricholoma conglobatum (VITT.) SACC.
Tricholoma equestre (L. ex FR.) QUÉL.
Tricholoma gambosum (FR.) GILL.
Tricholoma humosum (FR.) IMAI
Tricholoma nudum (BULL. ex FR.) QUÉL.
Tricholoma personatum (FR.) QUÉL.
Tricholoma pessundatum (FR.) QUÉL.
Tricholoma sejunctum (SOW. ex FR.) QUÉL.

10. The poisonous agarics in Hokkaido are the following seventeen species.

Amanita aspera (FR.?) QUÉL.
Amanita mappa (BATSCH ex FR.) QUÉL.
Amanita muscaria (L. ex FR.) QUÉL.
Amanita pantherina (DC. ex FR.) QUÉL.
Amanita phalloides (FR.) QUÉL.
Amanita porphyria (ALB. et SCHW. ex FR.) GILL.
Amanita verna (BULL. ex FR.) QUÉL.
Amanita virosa (FR.) QUÉL.
Amanitopsis agglutinata (BERK. et CURT.) SACC.
Armillaria japonica (KAWAMURA) IMAI
Entoloma lividum (BULL. ex FR.) QUÉL.
Inocybe rimosa (BULL. ex FR.) QUÉL.
Lepiota helveola BRES.
Panaeolus papilionaceus (BULL. ex FR.) QUÉL.
Panus stipticus [BULL.] FR.
Pholiota spectabilis (FR.) GILL.
Stropharia venenata IMAI

Contents

		Page
	Introduction	1
	Agaricaceae FR. emend. P. HENN.	2
	Key to the subfamilies and tribes	2
	Subfam. Amanitoideae IMAI	4
	Tribe Amaniteae SINGER emend. IMAI	4
	Key to the genera	5
	Genus *Amanita* (PERS. ex FR.) QUÉL. emend. ROZE	5
	Key to the sections and species	5
	Sect. Volvatae SCHROET.	6
1.	*Amanita virosa* (FR.) QUÉL.	6
2.	*Amanita verna* (BULL. ex FR.) QUÉL.	7
3.	*Amanita Caesarea* (SCOP. ex FR.) QUÉL.	8
4.	*Amanita subjunquillea* IMAI	10
5.	*Amanita phalloides* (FR.) QUÉL.	10
6.	*Amanita longistriata* IMAI	11
	Sect. Semilimbatae GILBERT	12
7.	*Amanita mappa* (BATSCH ex FR.) QUÉL.	12
8.	*Amanita porphyria* (ALB. et SCHW. ex FR.) GILL.	13
	Sect. Marginatae SCHROET.	14
9.	*Amanita solitaria* (BULL. ex FR.) KARST.	14
10.	*Amanita muscaria* (L. ex FR.) QUÉL.	16
11.	*Amanita pantherina* (DC. ex FR.) QUÉL.	17
12.	*Amanita sepiacea* IMAI	18
	Sect. Incompletae SCHROET.	19
13.	*Amanita pulchella* IMAI	19
14.	*Amanita flavipes* IMAI	19
15.	*Amanita aspera* (FR.?) QUÉL.	20
16.	*Amanita rubescens* (PERS. ex FR.) QUÉL.	21
17.	*Amanita spissa* (FR.) QUÉL.	22
18.	*Amanita spissacea* IMAI	23
	Genus *Amanitopsis* ROZE.	24
	Key to the sections and species	24
	Sect. Volvatae GILBERT.	25
1.	*Amanitopsis vaginata* (BULL. ex FR.) ROZE.	25
2.	*Amanitopsis fulva* (SCHAEFF. ex FR.) P. HENN.	26
3.	*Amanitopsis albida* (FR.) IMAI.	27
4.	*Amanitopsis strangulata* (FR.) ROZE.	28
5.	*Amanitopsis agglutinata* (BERK. et CURT.) SACC.	29
6.	*Amanitopsis clarisquamosa* IMAI.	29
7.	*Amanitopsis avellaneosquamosa* IMAI.	30
	Sect. Amanitellae (EARLE) GILBERT.	31
8.	*Amanitopsis farinosa* (SCHW.) ATKINS.	31

Page
Genus *Lepiota* (PERS. ex FR.) QUÉL. 32
Key to the subgenera, sections and species 32
Subgen. Eulepiota LANGE emend. IMAI. 33
Sect. Procerae FR. 33
1. *Lepiota procera* (SCOP. ex FR.) QUÉL. 33
2. *Lepiota rhacodes* (VITT.) QUÉL. 34
Sect. Clypeolariae FR. 35
3. *Lepiota acutesquamosa* (WEINM.) GILL. 35
4. *Lepiota clypeolaria* (BULL. ex FR.) QUÉL. 36
5. *Lepiota cristata* (BOLT. ex FR.) QUÉL. 37
6. *Lepiota subamanitiformis* IMAI. 38
7. *Lepiota helveola* BRES. 39
Sect. Pruinosae MURRILL. 39
8. *Lepiota naucina* (FR.) QUÉL. 39
9. *Lepiota seminuda* (LASCH) GILL. 40
Subgen. Cystoderma (FAYOD) IMAI. 41
10. *Lepiota granulosa* (BATSCH ex FR.) QUÉL. 41
11. *Lepiota amianthina* (SCOP. ex FR.) KARST. 42
12. *Lepiota ossaeiformispora* IMAI. 43
Subgen. Leucocoprinus (PAT.) KONR. et MAUBL. 43
13. *Lepiota cepaestipes* (SOW. ex FR.) QUÉL. 43
14. *Lepiota lutea* [BOLT.] GODFRIN. 44
15. *Lepiota pseudo-licmophora* REA. 45
Subgen. Limacella (EARLE) IMAI. 45
16. *Lepiota subglischra* IMAI. 45

Tribe Armillarieae IMAI. 46
Key to the genera 46
Genus *Armillaria* (FR.) QUÉL. 46
Key to the subgenera and species 47
Subgen. Verarmillaria IMAI. 47
1. *Armillaria Matsutake* S. ITO et IMAI. 47
2. *Armillaria caligata* (VIV.) GILL. 48
Subgen. Armillariella KARST. 49
3. *Armillaria mellea* (VAHL ex FR.) QUÉL. 49
4. *Armillaria corticata* (FR.) KARST. 50
5. *Armillaria japonica* (KAWAMURA) IMAI. 52
6. *Armillaria ventricosa* PK. 53
Subgen. Mucidula (PAT.) IMAI. 53
7. *Armillaria mucida* (SCHRAD. ex FR.) QUÉL. 53

Genus *Cortinellus* ROZE. 55
Key to the species 55
1. *Cortinellus edodes* (BERK.) S. ITO et IMAI. 55
2. *Cortinellus rutilans* (SCHAEFF. ex FR.) KARST. 57
3. *Cortinellus decorus* (FR.) KARST. 58
4. *Cortinellus scalptulatus* (FR.) KARST. 59

Page

5. *Cortinellus columbetta* (FR.) KARST. 59
6. *Cortinellus squarrulosus* (BRES.) IMAI. 60
7. *Cortinellus terreus* (SCHAEFF. ex FR.) KARST. 61
8. *Cortinellus vaccinus* (SCHAEFF. ex FR.) ROZE. 61
9. *Cortinellus imbricatus* (FR.) KARST. 62
10. *Cortinellus bulbiger* (ALB. et SCHW. ex FR.) GILL. 63

Tribe Tricholomateae IMAI. 64
Key to the genera 64
Genus *Tricholoma* (FR.) QUÉL. 64
Key to the subgenera, sections and species 65
Subgen. Eutricholoma LANGE emend. IMAI. 66
Sect. Limacina (FR.) IMAI. 66

1. *Tricholoma equestre* (L. ex FR.) QUÉL. 66
2. *Tricholoma sejunctum* (SOW. ex FR.) QUÉL. 67
3. *Tricholoma albobrunneum* (PERS. ex FR.) QUÉL. 68
4. *Tricholoma pessundatum* (FR.) QUÉL. 68
5. *Tricholoma porphyrophyllum* IMAI. 69

Sect. Rigida (FR.) IMAI. 70

6. *Tricholoma cartilagineum* (FR.) QUÉL. 70

Sect. Guttata (FR.) IMAI. 70

7. *Tricholoma gambosum* (FR.) GILL. 71
8. *Tricholoma verrucipes* (FR.) QUÉL. 72

Sect. Aggregata KONR. et MAUBL. 72

9. *Tricholoma conglobatum* (VITT.) SACC. 72
10. *Tricholoma humosum* (FR.) IMAI. 73

Subgen. Melaleuca (PAT.) IMAI. 74

11. *Tricholoma grammopodium* (BULL. ex FR.) QUÉL. 74
12. *Tricholoma melaleucum* (PERS. ex FR.) QUÉL. 75

Subgen. Rhodopaxillus (R. MAIRE) IMAI. 76

13. *Tricholoma personatum* (FR.) QUÉL. 76
14. *Tricholoma nudum* (BULL. ex FR.) QUÉL. 77

Subgen. *Micromphale* (MURRILL) IMAI. 78

15. *Tricholoma ulmarium* (BULL. ex FR.) KARST. 78

Genus *Clitocybe* (FR.) QUÉL. 79
Key to the subgenera, sections and species 79
Subgen. Euclitocybe IMAI. 80
Sect. Disciformes FR. 80

1. *Clitocybe nebularis* (BATSCH ex FR.) QUÉL. 80
   Clitocybe nebularis (BATSCH ex FR.) QUÉL. f. *alba* (LANGE) IMAI. .. 81
2. *Clitocybe clavipes* (PERS. ex FR.) QUÉL. 81
3. *Clitocybe aurantiaca* (WULF. ex FR.) STUDER. 82
4. *Clitocybe cerussata* (FR.) QUÉL. 83

Sect. Infundibuliformes FR. 84

5. *Clitocybe infundibuliformis* (SCHAEFF. ex FR.) QUÉL. 84

Page
6. *Clitocybe catinus* (Fr.) Quél. 85
Sect. Cyathiformes Fr. 86
7. *Clitocybe cyathiformis* (Bull. ex Fr.) Quél. 86
8. *Clitocybe fallax* Imai. 87
Subgen. Lepista (Fr.) Imai. 87
9. *Clitocybe gigantea* (Sow. ex Fr.) Quél. 87
10. *Clitocybe extenuata* (Fr.) Imai. 88

Genus *Laccaria* Berk. et Br. 89
Key to the species 89
1. *Laccaria laccata* (Scop. ex Fr.) Berk. et Br. 89
Laccaria laccata (Scop. ex Fr.) Berk. et Br. f. *minuta* Imai. 90
2. *Laccaria amethystea* [Bull.] Murrill. 91
3. *Laccaria murina* Imai. 91

Tribe Pleuroteae Imai. 92
Genus *Pleurotus* (Fr.) Quél. 92
Key to the subgenera and species 92
Subgen. Concharia Imai. 93
1. *Pleurotus cornucopiae* (Paul. ex Pers.) Rolland. 93
2. *Pleurotus ostreatus* (Jacq. ex Fr.) Quél. 94
3. *Pleurotus serotinus* (Pers. ex Fr.) Gill. 95
Subgen. Phyllotus (Karst.) Imai. 96
4. *Pleurotus porrigens* (Pers. ex Fr.) Gill. 96

Tribe Hygrophoreae P. Henn. emend. Imai. 97
Genus *Hygrophorus* Fr. 97
Key to the subgenera, sections and species 98
Subgen. Limacium Fr. 99
1. *Hygrophorus chrysodon* [Batsch] Fr. 99
2. *Hygrophorus eburneus* [Bull.] Fr. 100
3. *Hygrophorus Cossus* [Sow.] Fr. 101
4. *Hygrophorus erubescens* Fr. 102
5. *Hygrophorus capreolarius* (Kalchbr.) Sacc. 102
6. *Hygrophorus pudorinus* Fr. 103
7. *Hygrophorus lucorus* Kalchbr. 104
8. *Hygrophorus arbustivus* Fr. 104
9. *Hygrophorus agathosmus* Fr. 105
10. *Hygrophorus mesotephrus* Berk. et Br. 105
Subgen. Camarophyllus Fr. 106
Sect. Subturbinatae Lange. 106
11. *Hygrophorus virgineus* [Wulf.] Fr. 106
12. *Hygrophorus niveus* [Scop.] Fr. 107
13. *Hygrophorus subniveus* Imai. 108
Sect. Emarginatae Lange. 108
14. *Hygrophorus carnescens* Imai. 108
Subgen. Hygrocybe Fr. 109
Sect. Adnato-decurrentes Lange. 109

		Page
15.	*Hygrophorus ceraceus* [WULF.] FR.	109
16.	*Hygrophorus coccineus* [SCHAEFF.] FR.	110
17.	*Hygrophorus miniatus* FR.	111
	Sect. Emarginato-subliberae LANGE.	112
18.	*Hygrophorus conicus* [SCOP.] FR.	112
	Tribe Collybieae IMAI.	113
	Key to the genera	113
	Genus *Collybia* (FR.) QUÉL.	113
	Key to the sections and species	114
	Sect. Striaepedes FR.	114
1.	*Collybia radicata* (RELH. ex FR.) QUÉL.	115
2.	*Collybia platyphylla* (PERS. ex FR.) QUÉL.	116
3.	*Collybia lacerata* (LASCH) GILL.	117
4.	*Collybia maculata* (ALB. et SCHW. ex FR.) QUÉL.	118
5.	*Collybia butyracea* (BULL. ex FR.) QUÉL.	118
	Sect. Vestipedes FR.	119
6.	*Collybia velutipes* (CURT. ex FR.) QUÉL.	119
	Sect. Laevipedes FR.	120
7.	*Collybia esculenta* (WULF. ex FR.) QUÉL.	121
8.	*Collybia acervata* (FR.) GILL.	122
	Genus *Mycena* (FR.) QUÉL.	123
	Key to the sections and species	123
	Sect. Adonideae FR.	124
1.	*Mycena pura* (PERS. ex FR.) QUÉL.	124
	Sect. Rigidipedes FR.	125
2.	*Mycena galericulata* (SCOP. ex FR.) QUÉL.	126
3.	*Mycena polygramma* (BULL. ex FR.) QUÉL.	126
	Sect. Filipedes FR.	127
4.	*Mycena acicula* (SCHAEFF. ex FR.) QUÉL.	128
	Sect. Glutinipedes FR.	128
5.	*Mycena epipterygia* (SCOP. ex FR.) QUÉL.	128
6.	*Mycena viscosa* (SECR.) R. MAIRE.	129
7.	*Mycena citrinella* (PERS. ex FR.) QUÉL.	130
	Sect. Lactipedes FR.	131
8.	*Mycena haematopus* (PERS. ex FR.) QUÉL.	131
9.	*Mycena crocata* (SCHRAD. ex FR.) GILL.	132
	Genus *Omphalia* (PERS. ex FR.) QUÉL.	132
	Key to the sections, subsections and species	133
	Sect. Collybiariae FR.	133
	Subsect. Pyxidatae FR.	133
1.	*Omphalia epichysium* (PERS. ex FR.) QUÉL.	133
	Sect. Mycenariae FR.	134
	Subsect. Campanellae FR.	134
2.	*Omphalia campanella* (BATSCH ex FR.) QUÉL.	134
3.	*Omphalia umbratilis* (FR.) GILL.	135

Page

Genus *Marasmius* FR. 136
Key to the sections, subsections and species 136
Sect. Collybiae FR. 137
Subsect. Scortei FR. 137
1. *Marasmius confluens* (PERS. ex FR.) RICKEN. 137
2. *Marasmius oreades* [BOLT.] FR. 138
Sect. Mycenae FR. 139
Subsect. Chordales FR. 139
3. *Marasmius siccus* (SCHW.) FR. 139
Subsect. Rotulae FR. 140
4. *Marasmius rotula* [SCOP.] FR. 140
5. *Marasmius graminum* (LIBERT) BERK. et BR. 141

Tribe Lentineae IMAI. 141
Key to the genera 142
Genus *Lentinus* FR. 142
Key to the sections, subsections and species 142
Sect. Mesopodes FR. 143
Subsect. Lepidei FR. 143
1. *Lentinus lepideus* FR. 143
Subsect. Pulverulenti FR. 144
2. *Lentinus pulverulentus* [SCOP.] FR. 144
Subsect. Cochleati FR. 145
3. *Lentinus cochleatus* [PERS.] FR. 145
Sect. Pleuroti FR. 146
4. *Lentinus vulpinus* [SOW.] FR. 146
5. *Lentinus ursinus* FR. 146
6. *Lentinus flabelliformis* [BOLT.] FR. 147

Genus *Panus* FR. 148
Key to the sections and species 148
Sect. Conchati QUÉL. 148
1. *Panus rudis* FR. 148
Sect. Stiptici QUÉL. 149
2. *Panus stipticus* [BULL.] FR. 149

Genus *Trogia* FR. 150
1. Trogia *crispa* [PERS.] FR. 151

Genus *Schizophyllum* FR. 152
1. *Schizophyllum commune* FR. 152

Subfam. Volvarioideae IMAI. 153
Tribe Volvarieae IMAI. 153
Key to the genera 153
Genus *Volvaria* (FR.) QUÉL. 153
Key to the sections and species 154
Sect. Siccae SACC. 154
1. *Volvaria bombicina* (SCHAEFF. ex FR.) QUÉL. 154

Page

2. *Volvaria volvacea* (BULL. ex FR.) QUÉL. 155
Sect. Viscosae SACC. 156
3. *Volvaria speciosa* (FR.) GILL. 156
4. *Volvaria gloiocephala* (DC. ex FR.) GILL. 157
Genus *Pluteus* FR. emend. QUÉL. 158
Key to the sections and species 158
Sect. Fibrillosi IMAI 158
1. *Pluteus cervinus* (SCHAEFF. ex FR.) QUÉL. 159
2. *Pluteus salicinus* (PERS. ex FR.) QUÉL. 159
3. *Pluteus macrosporus* IMAI 160
4. *Pluteus pellitus* (PERS. ex FR.) QUÉL. 161
Sect. Pruinosi IMAI 161
5. *Pluteus nanus* (PERS. ex FR.) QUÉL. 161
6. *Plutues bulbosus* IMAI 162
Sect. Nudi IMAI 163
7. *Pluteus leoninus* (SCHAEFF. ex FR.) QUÉL. 163
8. *Pluteus phlebophorus* (DITM. ex FR.) GILL. 164
Tribe Entolomateae IMAI 164
Key to the genera 165
Genus *Entoloma* (FR.) QUÉL. 165
Key to the sections and species 165
Sect. Genuina FR. ....
1. *Entoloma lividum* (BULL. ex FR.) QUÉL. 166
2. *Entoloma prunuloides* (FR.) QUÉL. 166
3. *Entoloma erophilum* (FR.) KARST. 167
4. *Entoloma subnitidum* IMAI. 168
Sect. Leptonidea FR. 168
5. *Entoloma cyaneum* (PK.) SACC. 168
Sect. Nolanidea FR. 169
6. *Entoloma clypeatum* (L. ex FR.) QUÉL. 169
7. *Entoloma rhodopolium* (FR.) QUÉL. 170
8. *Entoloma nidorosum* (FR.) QUÉL. 171
Genus *Clitopilus* (FR.) QUÉL. 171
1. *Clitopilus caespitosus* PK. 172
2. *Clitopilus abortivus* (BERK. et CURT.) SACC. 172
Tribe Claudopeae IMAI 173
Genus *Claudopus* (W. G. SM.) GILL. 173
1. *Claudopus nidulans* (PERS. ex FR.) KARST. 174
Tribe Leptonieae IMAI. 174
Key to the genera 175
Genus *Leptonia* (FR.) QUÉL. 175
Key to the species 175
1. *Leptonia lampropus* (FR.) QUÉL. 175
2. *Leptonia umbrinella* IMAI. 176
3. *Leptonia sericella* (FR.) BARBIER. 177

		Page
	Genus *Nolanea* (FR.) QUÉL.	177
1.	*Nolanea mammosa* (L? ex FR.) QUÉL.	178
	Subfam. Pholiotoideae IMAI.	179
	Tribe Pholioteae IMAI.	179
	Key to the genera	179
	Genus *Rozites* KARST.	179
1.	*Rozites caperatus* (PERS. ex FR.) KARST.	180
	Genus *Pholiota* (FR.) QUÉL.	181
	Key to the sections, subsections and species	181
	Sect. Humigenae FR.	183
	Subsect. Velatae LANGE	183
1.	*Pholiota Vahlii* (SCHUM. ex FR.) LANGE.	183
	Subsect. Nudae LANGE.	184
2.	*Pholiota blattaria* (FR.) QUÉL.	184
3.	*Pholiota Arrhenii* (FR.) IMAI.	185
4.	*Pholiota praecox* (PERS. ex FR.) QUÉL.	186
5.	*Pholiota erebia* (FR.) GILL.	187
6.	*Pholiota togularis* (FR.) IMAI.	188
	Subsect. Squamosae IMAI.	189
7.	*Pholiota terrestris* OVERH.	189
	Sect. Truncigenae FR.	190
	Subsect. Carnosae LANGE.	190
8.	*Pholiota squarrosoides* (PK.) SACC.	190
9.	*Pholiota adiposa* (FR.) QUÉL.	190
10.	*Pholiota albocrenulata* (PK.) SACC.	191
11.	*Pholiota flammans* (BATSCH ex FR.) QUÉL.	192
12.	*Pholiota squarrosa* (MÜLL. ex FR.) QUÉL.	193
13.	*Pholiota aeruginosa* PK.	194
14.	*Pholiota spectabilis* (FR.) GILL.	195
15.	*Pholiota erinaceella* PK.	196
16.	*Pholiota radicosa* (BULL. ex FR.) QUÉL.	196
17.	*Pholiota Nameko* (T. ITO) S. ITO et IMAI.	197
	Subsect. Hygrophanae FR. emend. LANGE.	198
18.	*Pholiota marginata* (BATSCH ex FR.) QUÉL.	198
19.	*Pholiota unicolor* (VAHL ex FR.) GILL.	199
	Tribe Cortinarieae IMAI.	200
	Key to the genera	200
	Genus *Cortinarius* FR.	200
	Key to the subgenera, sections and species	201
	Subgenus Myxacium FR.	203
	Sect. Colliniti FR.	203
1.	*Cortinarius elatus* (PERS. ex FR.) SACC.	204
	Sect. Delibuti FR.	204
2.	*Cortinarius vibratilis* FR.	205

		Page
3.	*Cortinarius iodes* BERK. et CURT.	205
	Subgen. Phlegmacium FR.	206
	Sect. Cliduchii FR.	206
4.	*Cortinarius latus* [PERS.] FR.	206
5.	*Cortinarius infractus* [PERS.] FR.	207
	Sect. Scauri FR.	208
6.	*Cortinarius multiformis* FR.	208
7.	*Cortinarius caesiocyaneus* BRITZ.	209
8.	*Cortinarius purpurascens* FR.	209
9.	*Cortinarius fulgens* [ALB. et SCHW.] FR.	210
	Sect. Elastici FR.	211
10.	*Cortinarius decoloratus* FR.	211
	Subgen. Inoloma FR.	212
11.	*Cortinarius violaceus* [L.] FR.	212
	Subgen. Dermocybe FR.	213
12.	*Cortinarius cinnamomeus* [L.] FR.	213
13.	*Cortinarius sanguineus* [WULF.] FR.	214
14.	*Cortinarius croceo-conus* FR.	215
	Subgen. Telamonia FR.	215
	Sect. Mollipodes FR.	216
15.	*Cortinarius macropus* [PERS.] FR.	216
	Subgen. Hydrocybe FR.	216
	Sect. Firmiores FR.	217
16.	*Cortinarius jubarinus* FR.	217
	Sect. Tenuiore FR.	217
17.	*Cortinarius fasciatus* FR.	218
	Genus *Inocybe* (FR.) QUÉL.	218
	Key to the subgenera, and species	219
	Subgen. Euinocybe IMAI.	219
1.	*Inocybe rimosa* (BULL. ex FR.) QUÉL.	219
2.	*Inocybe geophylla* (SOW. ex FR.) QUÉL.	220
3.	*Inocybe lacera* (FR.) QUÉL.	221
	Subgen. Astrosporina IMAI.	222
4.	*Inocybe umbratica* QUÉL.	222
5.	*Inocybe praetervisa* QUÉL.	223
6.	*Inocybe plumosa* (FR.) QUÉL.	224
	Genus *Hebeloma* (FR.) QUÉL.	225
	Key to the sections and species	225
	Sect. Indusiata FR.	225
1.	*Hebeloma Tomoeae* IMAI.	226
2.	*Hebeloma mesophaeum* (PERS. ex FR.) QUÉL.	226
3.	*Hebeloma fimicolum* IMAI.	227
	Sect. Denudata FR.	228
4.	*Hebeloma fastibile* (PERS. ex FR.) IMAI.	228
5.	*Hebeloma longicaudum* (PERS. ex FR.) QUÉL.	229

		Page
6.	*Hebeloma helvolescens* IMAI.	229
7.	*Hebeloma humosum* IMAI.	230
	Genus *Gymnopilus* KARST.	230
	Key to the sections and species	231
	Sect. Lubrici FR.	231
1.	*Gymnopilus lubricus* (FR.) IMAI.	231
2.	*Gymnopilus lentus* (PERS. ex FR.) MURRILL.	232
3.	*Gymnopilus spumosus* (FR.) MURRILL.	233
	Sect. *Udi* FR.	234
4.	*Gymnopilus astragalinus* (FR.) IMAI.	234
	Sect. Sapinei FR.	235
5.	*Gymnopilus penetrans* (FR.) MURRILL.	235
6.	*Gymnopilus liquiritiae* (PERS. ex FR.) KARST.	236
	Tribe Rhodoteae IMAI.	237
	Genus *Rhodotus* R. MAIRE.	237
1.	*Rhodotus subpalmatus* (FR.) IMAI.	237
	Tribe Crepidoteae IMAI.	238
	Genus *Crepidotus* (FR.) QUÉL.	238
	Key to the species	238
1.	*Crepidotus mollis* (SCHAEFF. ex FR.) QUÉL.	239
2.	*Crepidotus haerens* (PK.) SACC.	240
3.	*Crepidotus herbarum* (PK.) SACC.	240
4.	*Crepidotus viticolus* IMAI.	240
5.	*Crepidotus terrestris* IMAI.	241
6.	*Crepidotus malachius* (B. et C.) SACC.	241
7.	*Crepidotus applanatus* (PERS. ex FR.) KARST.	242
8.	*Crepidotus longistriatus* IMAI.	242
	Tribe Paxilleae P. HENN. emend. HEIM.	243
	Key to the genera	243
	Genus *Paxillus* FR.	243
	Key to the subgenera and species	244
	Subgen. Veripaxillus IMAI.	244
1.	*Paxillus involutus* [BATSCH] FR.	244
	Subgen. Tapinia (FR. em. KARST.) IMAI.	245
2.	*Paxillus panuoides* FR.	245
	Genus *Phylloporus* QUÉL.	246
1.	*Phylloporus rhodoxanthus* (SCHW.) BRES.	246
	Tribe Naucorieae IMAI.	248
	Key to the genera	248
	Genus *Naucoria* (FR.) QUÉL.	248
	Key to the sections and species	248
	Sect. Gymnotae FR.	249
1.	*Naucoria Christinae* (FR.) SACC.	249

Page
2. *Naucoria abstrusa* (FR.) SACC. 249
Sect. Lepidotae FR. 250
3. *Naucoria conspersa* (PERS. ex FR.) QUÉL. 250
Genus *Galerula* KARST. 251
Key to the species 251
1. *Galerula tenera* (SCHAEFF. ex FR.) MURRILL. 251
2. *Galerula campanulata* (BULL. ex FR.) IMAI. 252
Genus *Pluteolus* (FR.) GILL. 253
1. *Pluteolus coprophilus* PK. 253
Subfam. Agaricoideae IMAI. 254
Tribe Agariceae IMAI. 254
Genus *Agaricus* L. ex FR. emend. KARST. 255
Key to the sections and species 255
Sect. Edules FR. 256
1. *Agaricus campestris* L. ex FR. 256
2. *Agaricus silvicola* (VITT.) SACC. 257
3. *Agaricus jezoensis* IMAI. 258
4. *Agaricus hortensis* (CKE.) IMAI. 258
5. *Agaricus silvaticus* SCHAEFF. ex FR. 259
6. *Agaricus arvensis* SCHAEFF. ex FR. 260
7. *Agaricus placomyces* PK. 261
8. *Agaricus subrufescens* PK. 262
Sect. Minores FR. 262
9. *Agaricus comtulus* FR. 262
10. *Agaricus comptulellus* IMAI. 263
11. *Agaricus diminutivus* PK. 264
12. *Agaricus semotellus* IMAI. 264
Tribe Stropharieae HEIM. 265
Key to the genera 265
Genus *Stropharia* (FR.) QUÉL. 265
Key to the sections and species 265
Sect. Viscipelles FR. 266
1. *Stropharia aeruginosa* (CURT. ex FR.) QUÉL. 266
2. *Stropharia aurantiaca* (CKE.) IMAI. 267
3. *Stropharia bulbosa* IMAI. 268
4. *Stropharia rugosoannulata* FARLOW. 268
5. *Stropharia Hornemanni* (FR.) LUNDELL et NANNF. 269
6. *Stropharia venenata* IMAI. 270
7. *Stropharia coronilla* (BULL. ex FR.) QUÉL. 270
8. *Stropharia merdaria* (FR.) QUÉL. 271
9. *Stropharia semiglobata* (BATSCH ex FR.) QUÉL. 272
0. *Stropharia stercoraria* (BULL. ex FR.) QUÉL. 273
1. *Stropharia umbonatescens* (PK.) SACC. 274

Page

Genus *Hypholoma* (FR.) QUÉL. 275
Key to the subgenera, sections and species 275
Subgen. Euhypholoma LANGE. 275
Sect. Flammuloides (QUÉL.) LANGE. 276
1. *Hypholoma lateritium* (SCHAEFF. ex FR.) SCHROET. 276
2. *Hypholoma epixanthum* (FR.) QUÉL. 277
3. *Hypholoma fasciculare* (HUDS. ex FR.) QUÉL. 278
Sect. Psathyroides LANGE. 279
4. *Hypholoma Candolleanum* (FR.) QUÉL. 279
5. *Hypholoma stipatum* (PERS. ex FR.) IMAI. 280
6. *Hypholoma hydrophilum* (BULL. ex FR.) QUÉL. 281
Subgen. Lacrymaria LANGE. 282
7. *Hypholoma velutinum* (PERS. ex FR.) QUÉL. 282

Tribe Gomphidieae HEIM. 283
Genus *Gomphidius* FR. 283
Key to the sections and species 284
Sect. Viscigomphus IMAI. 284
1. *Gomphidius rutilus* (SCHAEFF. ex FR.) IMAI. 284
2. *Gomphidius gracilis* BERK. et BR. 285
Sect. Floccigomphus IMAI. 285
3. *Gomphidius tomentosus* MURRILL. 285

Tribe Coprineae HEIM. 286
Key to the genera 286
Genus *Psilocybe* (FR.) QUÉL. 287
Sect. Rigidae FR. 287
1. *Psilocybe foenisecii* (PERS. ex FR.) QUÉL. 287

Genus *Panaeolus* (FR.) QUÉL. 288
Key to the sections and species 288
Sect. Appendiculati LANGE. 289
1. *Panaeolus Linnaeanus* IMAI. 289
2. *Panaeolus retirugis* (FR.) GILL. 290
3. *Panaeolus papilionaceus* (BULL. ex FR.) QUÉL. 291
Sect. Nudi LANGE. 292
4. *Panaeolus fimicola* (FR.) QUÉL. 292

Genus *Psathyra* (FR.) QUÉL. 293
Key to the species 293
Sect. Obtusatae FR. 293
1. *Psathyra multissima* IMAI. 593
2. *Psathyra microspora* IMAI. 294

Genus *Psathyrella* (FR.) QUÉL. 294
Key to the species 295
Sect. Pruinatipedes IMAI. 295
1. *Psathyrella disseminata* (PERS. ex FR.) QUÉL. 296
2. *Psathyrella atomata* (FR.) QUÉL. 296

Page

Genus *Coprinus* PERS. ex FR. 297
Key to the sections, subsections and species 297
Sect. Pelliculosi FR. 298
Subsect. Comati FR. 298
1. *Coprinus comatus* PERS. ex FR. 298
Subsect. Atramentarii FR. 299
2. *Coprinus atramentarius* [BULL.] FR. 299
Subsect. Micacei FR. 300
3. *Coprinus micaceus* [BULL.] FR. 300
4. *Coprinus radians* (DESM.) FR. 301
Sect. Veliformes FR. 302
Subsect. Furfurelli FR. 302
5. *Coprinus stercorarius* [SCOP.] FR. 302
6. *Coprinus tuberosus* QUÉL. 303
7. *Coprinus plicatilis* [CURT.] FR. 304

Subfam. Lactarioideae IMAI. 304
Key to the genera 305
Genus *Lactarius* FR. 305
Key to the sections, subsections and species 305
Sect. Piperites FR. 307
Subsect. Tricholomoidei FR. 307
1. *Lactarius scrobiculatus* [SCOP.] FR. 307
2. *Lactarius torminosus* [SCHAEFF.] FR. 308
3. *Lactarius necator* (PERS. ex FR.) KARST. 309
4. *Lactarius flavidulus* IMAI. 310
Subsect. Limacini FR. 311
5. *Lactarius insulsus* FR. 311
6. *Lactarius zonarius* [BULL.] FR. 312
7. *Lactarius trivialis* FR. 312
8. *Lactarius akanensis* IMAI. 313
9. *Lactarius uvidus* FR. 314
Subsect. Piperati FR. 315
10. *Lactarius piperatus* [SCOP.] FR. 315
Lactarius piperatus [SCOP.] FR. f. *pergamenus* (SWARTZ ex FR.) IMAI. 316
11. *Lactarius vellereus* FR. 317
Sect. Russularia FR. 318
Subsect. Viscidi IMAI. 318
12. *Lactarius avellaneus* IMAI. 318
13. *Lactarius victus* FR. 318
14. *Lactarius quietus* FR. 319
15. *Lactarius thejogalus* [BULL.] FR. 320
Subsect. Impoliti IMAI. 321
16. *Lactarius rufus* [SCOP.] FR. 321
17. *Lactarius helvus* FR. 322
18. *Lactarius griseus* PK. 323

Page
19. *Lactarius Sakamotoi* IMAI. 323
20. *Lactarius hygrophoroides* BERK. et CURT. 324
21. *Lactarius lignyotus* FR. 324
22. *Lactarius fuliginosus* FR. 325
23. *Lactarius luteolus* PK. 326
Subsect. Glabrati IMAI. 327
24. *Lactarius volemus* FR. 327
25. *Lactarius subdulcis* [PERS.] FR. 328
Sect. Dapetes FR. 329
26. *Lactarius deliciosus* [L.] FR. 329
Lactarius deliciosus [L.] FR. f. *lacticolorus* IMAI. 331
Lactarius deliciosus [L.] FR. f. *virescens* IMAI. 331
27. *Lactarius sanguifluus* [PAUL.] FR. 331

Genus *Russula* PERS. ex FR. 332
Key to the sections, subsections and species 333
Sect. Constantes SING. 335
Subsect. Chamaeleontinae SING. 335
1. *Russula olivascens* PERS. ex FR. 335
Subsect. Alutaceinae M. et Zv. emend. SING. 336
2. *Russula alutacea* PERS. ex FR. 336
3. *Russula aurata* [WITH.] FR. 337
Subsect. Integrinae SING. 338
4. *Russula integra* [L.] FR. 338
Subsect. Emeticinae M. et Zv. emend. SING. 339
5. *Russula atropurpurea* (KROMBH.) R. MAIRE. 339
6. *Russula lilacea* QUÉL. 340
7. *Russula emetica* [SCHAEFF.] FR. 340
8. *Russula fragilis* f. *nivea* (PERS. ex FR.) SING. 341
Subsect. Foetentinae M. et Zv. emend. SING. 342
9. *Russula foetens* [PERS.] FR. 342
10. *Russula subfoetens* W. G. SM. 343
11. *Russula citrina* GILL. 344
12. *Russula senecis* IMAI. 344
13. *Russula ochroleuca* PERS. ex FR. 345
14. *Russula sororia* FR. 346
Subsect. Cyanoxanthinae SING. 346
15. *Russula cyanoxantha* [SCHAEFF.] FR. 346
Sect. Rigidae FR. emend. SING. 347
Subsect. Virescentinae SING. 347
16. *Russula virescens* [SCHAEFF.] FR. 348
Subsect. Lepidinae M. et Zv. emend. SING. 349
17. *Russula lactea* [PERS.] FR. 349
18. *Russula uncialis* PK. 350
Sect. Compactae FR. emend. SING. 350
Subsect. Nigricantinae M. et Zv. emend. SING. 350

		Page
19.	*Russula nigricans* [BULL.] FR.	351
	Subsect. Delicinae M. et Zv. emend. SING.	351
20.	*Russula delica* FR.	352
	Russula delica FR. f. *chloroides* (KROMBH.) IMAI.	353
	Subfam. Cantharelloideae IMAI.	353
	Key to the genera	353
	Genus *Cantharellus* [ADANS.] FR.	353
	Key to the sections and species	354
	Sect. Mesopus FR.	354
1.	*Cantharellus cibarius* FR.	354
2.	*Cantharellus minor* PK.	355
3.	*Cantharellus infundibuliformis* [SCOP.] FR.	356
4.	*Cantharellus cinereus* [PERS.] FR.	357
5.	*Cantharellus floccosus* SCHW.	357
	Sect. Pleuropus FR.	358
6.	*Cantharellus pallidus* LLOYD.	358
	Genus *Neurophyllum* PAT.	359
1.	*Neurophyllum clavatum* (PERS. ex FR.) PAT.	359
Conclusion		360
Contents		364
Explanation of Plates.		

Explanation of Plate IV

Fig. 1. *Pholiota Vahlii* (SCHUM. ex FR.) LANGE.

Fig. 2. *Pholiota praecox* (PERS. ex FR.) QUÉL.

Fig. 3. *Pholiota albocrenulata* (PK.) SACC.

Fig. 4. *Pholiota Nameko* (T. ITO) S. ITO et IMAI.

Fig. 5. *Cortinarius caesiocyaneus* BRITZ.

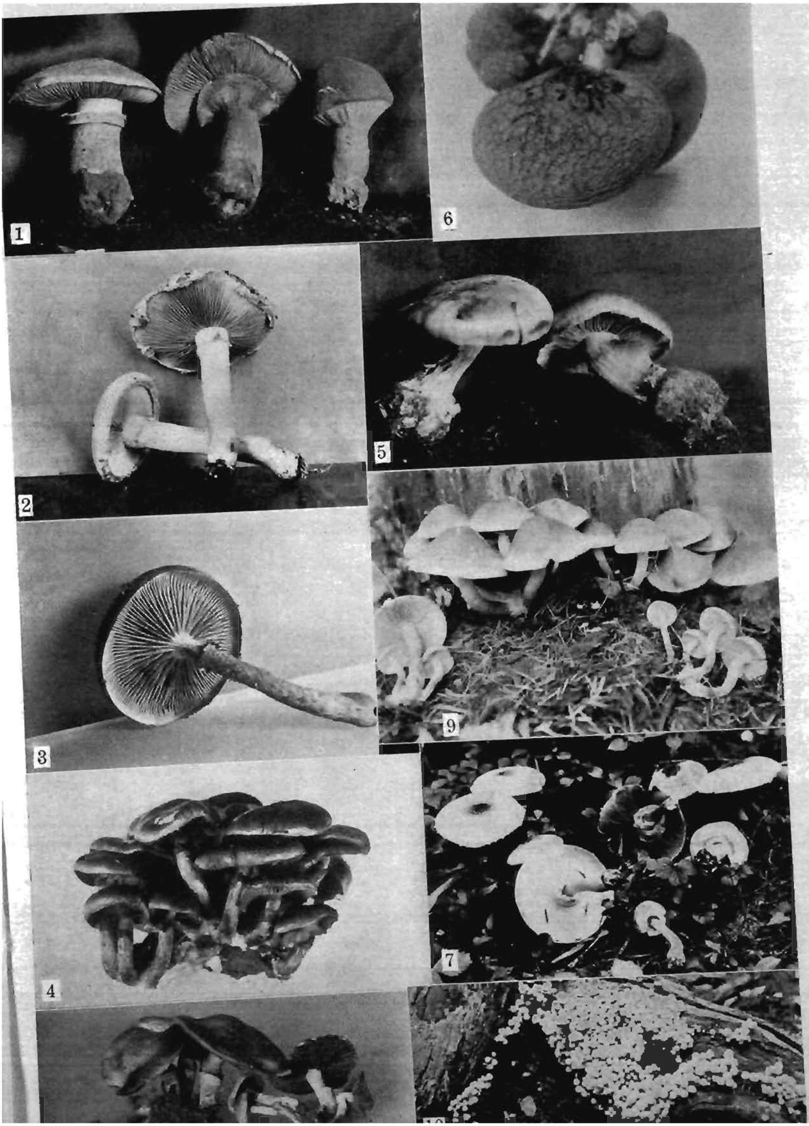
Fig. 6. *Rhodotus subpalmatus* (FR.) IMAI.

Fig. 7. *Agaricus placomyces* PK.

Fig. 8. *Stropharia venenata* IMAI.

Fig. 9. *Hypholoma lateritium* (SCHAEFF. ex FR.) SCHROET.

Fig. 10. *Psathyrella disseminata* (PERS. ex FR.) QUÉL.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7
9

Explanation of Plate V

Fig. 1. *Coprinus comatus* PERS. ex FR.

Fig. 2. *Psathyra multissima* IMAI.

Fig. 3. *Lactarius piperatus* [SCOP.] FR.

Fig. 4. *Lactarius vellereus* FR.

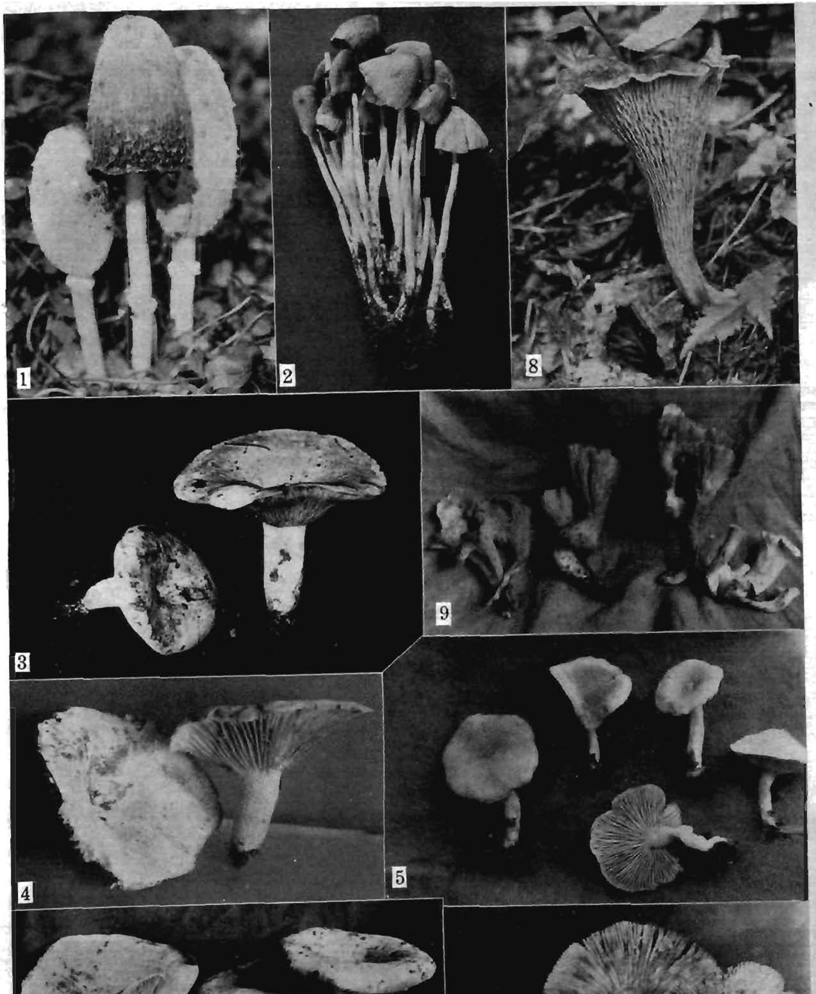
Fig. 5. *Lactarius griseus* PK.

Fig. 6. *Lactarius deliciosus* [L.] FR.

Fig. 7. *Russula senecis* IMAI.

Fig. 8. *Cantharellus floccosus* SCHW.

Fig. 9. *Cantharellus pallidus* LLOYD.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